

MACHINE-GUN TACTICS

BY

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14th (King's) Hussars

THIRD EDITION, REVISED

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PREFACE TO FIRST EDITION

THIS book, which was begun five years ago, is now published because I feel that, with all its faults, it may bring into greater prominence the latent possibilities of the machine gun, and the vital necessity for the most complete organisation and tactical training of the detachments.

I desire to express my great indebtedness to Captain C. O. Place, D.S.O., Royal Engineers, who undertook the work of editing and preparing the book for the press at a moment's notice on my sailing for India.

R. V. K. APPLIN.

R.I.M.S. "NORTHBROOK,"

December 1st, 1909.

PREFACE TO THIRD EDITION

THE great demand for this book due to the War compelled the publisher to issue the second edition without waiting for the author's corrections. A third edition is now called for, and the author has been able to bring the book up to date in all essentials to conform to the latest teachings of the official text-books.

Many changes have taken place in the organisation and training of machine-gun detachments since the author wrote the first edition, notably the brigading of guns as therein suggested, so that it is with real satisfaction that he finds the tactical principles advocated have been so fully confirmed by the present war that it has not been necessary to alter this part of the book in any essential detail.

The note on "Care of Machine-Guns" at the end of the book will be of special value to those on service in the field, and will be found in no other publication. The author is indebted to Armourer Q.M.S. Jack for this information, which is the result of many years' experience in the care of machine guns.

R. V. K. APPLIN.

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July 21st, 1915.

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MACHINE-GUN TACTICS

CHAPTER I

DESCRIPTION AND ORGANISATION

THE modern machine gun is essentially an automatic weapon of small-arm calibre, capable of firing from 100 to 600 shots a minute from a light mounting of extreme mobility, and should fulfil the following qualifications :

1. It should be able to deliver about 400 shots a minute without loss of accuracy, even with prolonged "continuous firing."

2. It should be capable of accompanying cavalry and infantry wherever these arms can go ; it should occupy the smallest space, and be able to come into action quickly at rifle range.

3. It should have a firm mounting, upon which the gun is steady, and from which it can be aimed rapidly and fired while kneeling, sitting, or lying.

4. The gun and its mounting must present a small target, and be light enough for each, and if possible, both, to be carried by one man for a considerable distance, and should admit of being dragged by a man crawling or crouching for short distances.

5. It should be in constant readiness for action, and able, when limbered up, to open fire in less than thirty seconds.

6. It should be simple, strong, and durable. Mobility and constant readiness for action are indispensable with cavalry, while lightness and smallness of target are essential factors.

There are eight main types of machine guns at present in use in the armies of the world, viz. :

Gun.	In use in
Maxim	Great Britain, Germany, Russia, Italy, Portugal, Turkey, Switzerland, and U.S.A.
Hotchkiss	France, Japan, Belgium, Norway, Sweden, Spain, and Portugal.
Perino	Italy.
Puteaux	France.
Schwarzlose	Austria.
Skoda	Japan and China.
Madsen	Russia, Denmark (Rekyl pattern), and China (for cavalry).
Colt	By several countries in addition to adopted gun.

The principal differences between these guns are : (a) The automatic mechanism. (b) Method of loading.

(a) may be divided into two classes : 1. *Recoil action*—the Maxim, Perino, and the Madsen. 2. *Gas-pressure action*—the Schwarzlose, Hotchkiss, Skoda, and Colt.

(b) consists of three classes : 1. *Belt loaders*—the Maxim, Schwarzlose, and Colt. 2. *Metal clip loaders*—Hotchkiss, Madsen, Perino, and Puteaux. 3. *Hopper loaders*—the Skoda.

Several of the above countries—notably Russia, Japan,

France, and Austria—have more than one pattern of gun in their service, and it is difficult to say which they intend finally to adopt; but Russia, since the Japanese war, has ordered several thousand Madsen guns, and Japan is said to be trying this gun, one of which during the war fired 25,000 shots in a single day.

The Rexar gun has been purposely omitted; it only weighs 17½ lb., but is fired from the shoulder, and is therefore more of the nature of an automatic rifle than a machine gun. It would take too long to deal with each of these weapons separately, therefore the Maxim has been selected as the type with which to discuss the question of tactics.

In order thoroughly to understand the methods that should govern the tactical employment of machine guns, and their place in the battlefield, it is first necessary clearly to realise their nature and potentialities, and for this purpose we will examine their principal characteristics. Guns of this class are capable of firing service small-arm ammunition at the rate of 800 shots in one minute, but this very high rate of fire is obviously undesirable for several reasons—the principal, from a military point of view, being that, however skilfully the gun is handled, a great waste of ammunition must ensue, and hundreds of shots be wasted in space, however accurate the fire. These guns are, therefore, regulated to fire at a maximum rate of from 400 to 500 rounds a minute, or seven to eight shots a second, but even this is greater than is necessary to obtain the maximum fire effect; at ordinary targets 100 to 250 rounds a minute,

according to the nature of the target, has been found to give the best results in practice. The "rate of fire" of a gun must not be confused with the number of rounds that can be fired from it effectively in one minute; the necessity for frequent pauses to observe the effect, to correct the elevation and direction of the fire, prevent a greater number than from 150 to 250 shots being fired effectively in one minute from a gun whose rate of fire is 450 shots a minute. Colonel Mayne, in his book *The Infantry Weapon and its Use in War*, says: "The machine gun now in use can fire about 600 rounds a minute, or ten a second. This is a far greater rapidity of fire than is really necessary, for it means that a man or horse is struck several times before falling. It is a good thing to be able to fire 600 rounds a minute on occasions (such as for range-finding), but a far slower rate of fire (say 100 rounds or even less a minute) is ample for all ordinary tactical purposes against living beings and animals, whilst causing an enormous saving of ammunition."

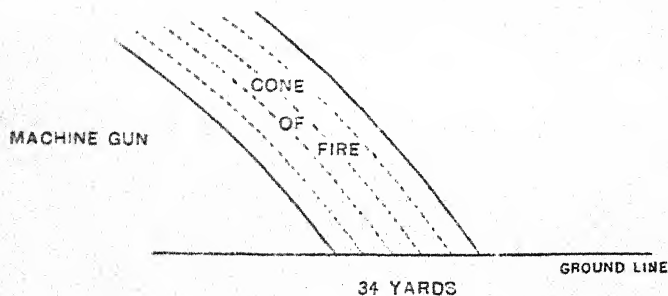
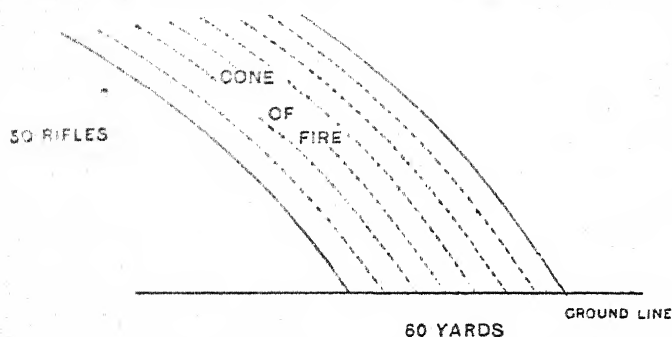
The extreme range of this type of gun is for all practical purposes the same as that of the infantry rifle—about 3,500 yards—though it is more effective at the longer ranges than an equal volume of rifle fire, owing to the ease with which the firer can elevate and aim the gun on its mountings and the stability of this mounting, which causes it to have a beaten zone of only half the depth and nearly half the width of that of infantry firing the same number of rounds. This has been proved again by actual experiment at the schools of musketry in England, India, and

DESCRIPTION AND ORGANISATION 5

South Africa, while very elaborate experiments and trials carried out in Germany with the Maxim gun on the carriage adopted for that service proved that the

DIAGRAM I

TO SHOW THE ZONE BEATEN BY 50 PER CENT. OF BULLETS



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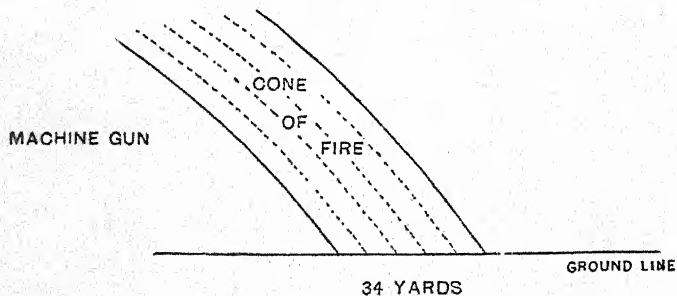
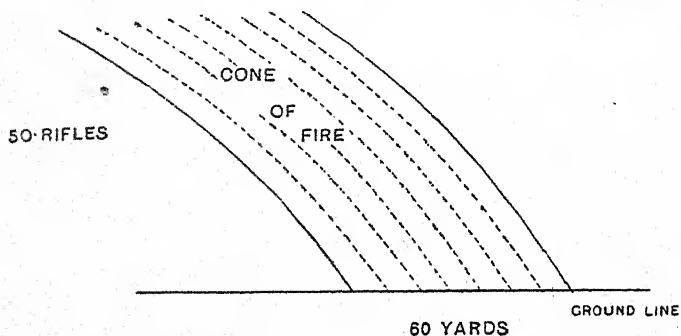
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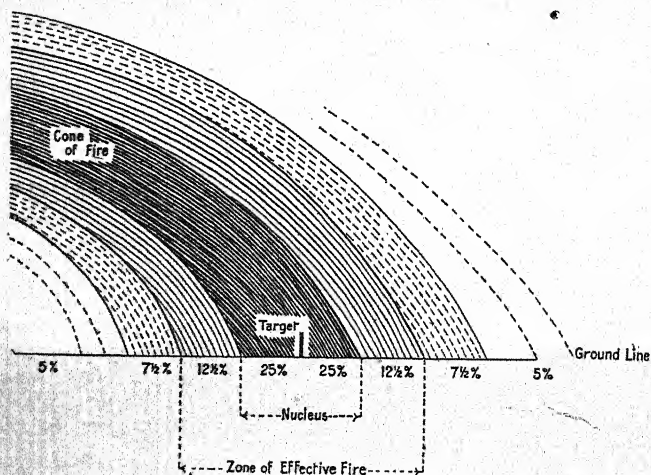
beaten zone was only one-sixth of that obtained by infantry, probably because of the greater stability of their mounting.

In order that "fire" may be "effective," it is neces-

sary to bring the enemy within the zone beaten by 75 per cent. of shots, and it has been found by experiment that 25 per cent. of shots fall immediately in front of and behind the target, then $12\frac{1}{2}$ per cent., $7\frac{1}{2}$ per cent.,

DIAGRAM II

TO SHOW THE DISPERSION OF BULLETS



and, finally, 5 per cent. scattered far in front and behind.

Infantry usually fire at the rate of three rounds a minute "slow," and fifteen rounds a minute "rapid"; "slow" fire is the ordinary rate, and "rapid" fire can only be effectually maintained for about four minutes; but this is when the firer is fresh, and has not been

subjected to several hours' marching and fighting as would be the case in battle, and it is doubtful if "rapid" fire can be kept up on service for more than one and a half to two minutes without becoming wild and consequently ineffective. On the other hand, "rapid" fire is less tiring to the machine gunner than "deliberate" fire; the gun is held for him by the mounting, it loads and fires itself, while elevation and direction are maintained without the least exertion on his part by the elevating and traversing gears.

In comparing the volume of machine-gun fire with that of a body of infantry, it is obvious that much will depend upon the circumstances under which the test takes place, the range, the nature of the target, and the individual skill of the firers, particularly the machine gunner. At an unsuitable machine-gun target, such as a line of men lying down, or a trench, the necessity for great accuracy in holding the gun, and short bursts of fire, with pauses for traversing and "tapping," the machine gun may be expected to be inferior in fire effect to a number of rifles equal to the length of the trench or line. On the other hand, at a deep target such as a company of infantry in "fours" on a road, a machine gun might be superior in effect to a hundred rifles if their fire was uncontrolled, or improperly directed. It must be always remembered that the object of the fire fight is to bring a concentrated and overwhelming fire to bear *at the right moment* on certain positions of the enemy, and when the moment arrives machine guns can and will use the most rapid rate of fire possible, which

will be from 250 to 300 rounds a minute, or equal to that of 50 to 100 riflemen. Mere volume of fire, however, is useless without control, accuracy, and concentration, and it is here that the machine gun is so vastly superior to the rifle; for amongst 50 men using their rifles there can only be a small percentage of good shots, while even among the good shots unforeseen factors, such as fatigue, bad fire positions, excitement, wrong sighting, failure to see the target, etc., cause a large percentage of the shots to go astray, and make it very difficult to concentrate the fire on any particular position of the enemy.

An object-lesson to illustrate this superiority of the machine gun has been carried out during each course at the South African school of musketry under circumstances most favourable to the rifles. The record of one such test, carried out on September 21st, 1904, between a Maxim gun mounted on Mark III. tripod and 42 rifles (Lee Enfield), was published. The machine gun was worked by two sergeant-instructors, while the 42 rifles were fired by students who were all, at least, 1st Class shots before joining the school, and who for five weeks had been receiving daily instruction in musketry, and had just completed a course of firing both on the ranges (Table B) and in field-firing, and had gone through a course of judging distance. The range was unknown, the number of rounds unlimited, and the rate of fire "rapid." The time was limited to one minute, and the firers were allowed to charge their magazines before starting. The targets were figures representing infantry

in line extended to two paces. The following was the result :

	Rounds fired.	Hits.	Percentage.	Figures hit.	Percentage of loss.
Rifles	408	62	15.1	27	54
Maxim	228	69	30.2	32	64

The small number of rounds fired by the Maxim was due to the necessity of picking up the range by firing small groups of five or ten shots and observing the strike of the bullets. What is most interesting is that although the rifles fired nearly twice as many shots as the machine gun, the latter made actually more hits, while the percentage of loss inflicted was 10 per cent. greater. The actual range was 1,000 yards. A similar experiment was carried out during the annual training for 1908 in the U.S.A. between 42 "sharpshooters" and a Maxim at the regulation "L" target. The ranges were 600, 800, 1,000 yards; the sharpshooters fired an average of 750 rounds at the three distances and made an average of 429 hits, which gave a collective figure of merit of 59.09. The machine gun also fired 750 rounds, made 601 hits, giving a collective figure of merit of 79.54, being 22.45 in favour of the machine gun. The troops were armed with new rifles, and fired the new "S" bullet, while the machine gun used the old pattern ammunition and a barrel that had fired at least 7,000 shots. The gun squad had no previous practice at this target, and the gun was fired by different men at the several ranges. The collective fire of the troop was "slow aimed," while the fire of the machine gun was "rapid continuous" for the number of rounds at each

range. The machine gun took 30 seconds to fire 250 shots at each range, or a quarter that of the troop.*

The two experiments are particularly interesting, as showing how closely the results agree, although the conditions are dissimilar in one respect: viz. that in the first case the number of rounds was unlimited and the result had to be obtained within one minute; while in the second case time was unlimited, but the number of rounds fired by each was the same. The result of the two experiments show that both in accuracy and rapidity a machine gun is much superior to 42 picked shots, whether firing the same number of rounds at known ranges or firing an unlimited number of shots in a given time at an unknown range. We shall not be wrong, then, if we say that a machine gun is at least equal to 50 rifles in fire value †; but there are other factors to be considered as well as fire effect in determining its tactical value, and it is in these other factors that machine guns are so far superior to riflemen as to make a reliable estimate of their relative value almost impossible; these factors are: (1) Mobility; (2) Visibility; (3) Vulnerability.

Mobility.—The mobility of the infantry soldier is limited to the rate at which he can march, which on the

* Lieutenant A. E. Phillips, in the *Journal U.S.A. Cavalry Association*, July 1909.

† The Germans consider its fire value equal to 120 rifles. Our *Infantry Training*, 1914, gives the volume of fire from a machine gun as equal to that of about 30 men firing rapidly; but the advantages in the way of control, accuracy, and concentration (see page 29) must be taken as rendering its fire value equal to that of a much larger number of men.

battlefield is about 100 yards a minute, or less than three and a half miles an hour. Doubling may be left out of the question, as it quickly reduces fire efficiency to a minimum. An experiment made in the Austrian Army showed that the percentage of hits, which was 76·5 per cent. after an advance in quick time, fell to 51 per cent. after doubling.* The mobility of the machine gun will depend almost entirely on the way it is carried, and must not be judged by any particular carriage which may happen to be in use for the time being in our own service.

The infantry carriages are heavy, clumsy, and conspicuous, and are the least mobile of all; they can hardly be moved out of a walk without risk, and Marks III. and IV. cannot come into action without first unharnessing the mule or horse, and they then have to be dragged into position by the whole detachment—thus presenting a most conspicuous and vulnerable target at the moment when least desired and when concealment and invisibility are essential to tactical success.† In the German Official Account of the late Boer War, issued by the General Staff, is the following criticism of this carriage :

“Both sides have machine guns, but the rather clumsy mountings of those used by the British offered too high a target, and so prevented their being advanced from position to position during the attack.”

The tripod mounting, which is light and inconspicuous, is carried with the gun on a limbered wagon; but the advantages of its lightness and portability are almost

* Balck's *Modern European Tactics*.

† These are still in use in the Territorial Army.

neutralised by being carried on a wagon, thus reducing its mobility by confining it to ground suitable for wheeled vehicles.

If used on a pack-saddle the difficulty of managing a led animal on foot in the stress of battle may become insuperable, and moving the gun in and out of action is entirely dependent on the docility of the pack-animal. The new gun weighs 38 lb., while the mounting need not weigh more than 34 lb. The combined weight of a gun and mounting should never exceed 120 lb. and can be as little as 74 lb.

In whatever way it is decided to carry the gun, it is a *sine qua non* that it must be at least as mobile as the arm to which it belongs. There is no reason why it should not be as mobile as cavalry, and the choice remains between a pack-horse with a mounted detachment or a galloping carriage; and the former is in every way preferable, principally because it can carry the gun and ammunition across any country, and can come into action in less than 30 seconds on an adjustable tripod, which can be carried by hand into any position and presents a very small, inconspicuous target.

The majority of foreign countries have adopted pack transport for their machine guns. It is desirable with infantry and absolutely essential with cavalry. A suitable saddle is, of course, indispensable, and strong spiral springs to the hooks which hold the gun and tripod on either side will entirely prevent horses from straining their backs when galloping across country or jumping obstacles with the guns. These hooks must be leather-

covered and made to fit the gun exactly, and, in order to do away with the present cumbersome straps and buckles, they should have a hinged attachment to close over the gun and lock automatically in such a way as to admit of its being opened by a single movement when it is required to dismount the gun. The Swiss and the Americans have permanently adopted pack transport for the machine guns with their cavalry, which are able to accompany them over any country without detriment to either horses or guns; and in the American Army the average time for a well-trained cavalry machine-gun detachment to go into action front, from mounted formation, unpack, and set up the guns, load, aim, and open fire, is 25 seconds; while at the departmental meeting for 1908 the machine guns of the 10th Cavalry, from the halt in line, *moved forward in section column at a gallop for 200 yards and went into action and fired a blank shot in 31 seconds.**

This brings us to the second factor—*Visibility*. It is absolutely necessary, for the successful tactical employment of machine guns, that they should be as inconspicuous as possible when in action; the gun itself is a very small object when close to the ground, and its visibility will depend almost entirely on the nature of mounting and its adaptability for use behind cover of varying heights. All our infantry carriages are so conspicuous as to be quite unconcealable except in defence, the wheels being 4 ft. 8 in. in diameter and the gun axis 3 ft. 6 in. above the ground. The Mark IV. tripod is the handiest

* *Journal of U.S.A. Cavalry Association*, July 1909.

and least conspicuous of the mountings at present in use in our service, and although it weighs 48 lb. it can be carried into almost any position and easily concealed. It can be adjusted to fire at any desired height between $14\frac{1}{2}$ and 30 in. above the ground-level, and consequently can be used from behind any suitable cover; it has an all-round traverse.

Vulnerability.—The question of vulnerability would appear at first to depend entirely on visibility, or, in other words, on the target presented to the enemy's fire; but this is only true to a certain extent. To obtain the minimum vulnerability it is of course necessary to have the gun as low and inconspicuous as possible, because, the less it can be seen and the better cover it can obtain, the more difficult it will be to locate and hit. But the true vulnerability of the gun in comparison with infantry lies in the amount of front they occupy respectively; in other words, the breadth of the target exposed to the enemy and the percentage of loss they can each sustain *without their fire effect being reduced*. Infantry will never again fight in two ranks in civilised warfare, and the closest formation possible for a firing line is one pace per man; 50 men will therefore occupy a front of, roughly, 50 yards; in other words, the target presented to the enemy is 50 yards in breadth, and, provided the elevation is correct, shots striking anywhere within this 50 yards will be effective. The machine gun, however, only occupies a front of from 4 ft. to 5 ft. 2 in., or $\frac{1}{10}$ th the front offered by infantry having equal fire effect. It is on this point that the

wonderful tactical possibilities of the machine gun rest: *the maximum of rifle fire from the minimum of front.* It is obvious that 10 per cent. of casualties in the infantry firing line reduce the fire effect by just that amount, while from 30 to 40 per cent. will probably silence its fire altogether or render it ineffective. The machine gun, on the other hand, is unaffected by even 50 per cent. of loss, while it can suffer 80 per cent. of loss without diminishing its fire effect, though such a loss would of course cause it to lose its mobility and seriously affect the morale of the gunners. A machine-gun detachment consists of from 16 to 24 men,* but only two of them actually work the gun, and one man alone can fire the gun once it is in action, the second man merely assisting him with the ammunition, etc.; but he is not absolutely necessary to the firing of the gun. Thus we see that the killing of the gunner only causes a momentary cessation of fire until another man takes his place, when the fire is resumed without loss of intensity, accuracy, or concentration.

We are now in a position to form an accurate estimate of the potentialities of the machine gun and its true tactical value as compared with infantry, and we find:

1. Its fire effect = 50 rifles at least.
2. Its mobility = Cavalry.
3. Its visibility = A file (2 men).
4. Its vulnerability = Unaffected by 50% of loss.

* War Establishments, 1914, gives the personnel of a M. G. Section (2 machine guns) as 1 officer, 1 sergeant, and 16 rank and file.

Before discussing their place in battle and tactical use, it will be necessary to say a few words on the best methods of grouping the guns and organising their detachments and the training of the personnel in peace for the duties they will have to perform in war. In our service two machine guns are issued to each regiment of cavalry and battalion of infantry, and the detachment consists of:

	Cavalry	Infantry
Subaltern	1	1
Sergeant	1	1
Rank and file	25	16
	<hr/> 27	<hr/> 18

This section of two guns is therefore the smallest tactical unit, and the officer in command is solely responsible for the training and efficiency of his section. It is therefore absolutely essential that the machine-gun section commander should be a subaltern of not less than three years' service, specially selected for his keenness, efficiency, and self-reliance, who has passed the examination "C." for promotion, and who holds the special machine-gun certificate from a School of Musketry. A "destroyer" in the Royal Navy is commanded by a very junior officer, but he is most carefully selected for similar qualities to those mentioned, and is in addition required to possess the necessary professional qualifications—consequently it is a command much sought after, and competition enables the authorities to appoint the pick of the service and thus obtain the maximum efficiency where efficiency is the

essence of successful employment in war. The best and nothing but the best is necessary to the successful employment of machine guns, and the importance of obtaining the very best officers as section commanders is so great that there is reason to doubt the utility of having machine guns at all if they are not commanded and handled by those who are in every way expert in their use.

In order to enable machine-gun sections to be trained in tactics and to co-operate with larger units in war, it is essential that they should be trained under a senior officer during peace. The late Colonel Henderson said of the Volunteers in Mexico: "The ideal of the battle is a combined effort directed by a well-trained leader. As individuals they fought well; as organised bodies capable of manœuvring under fire and of combined effort, they proved to be comparatively worthless." This is precisely the case of regimental machine guns. It is easy enough to use a section or even a single gun apart from its battery should occasion require, but it is impossible to improvise a battery from a number of separate sections. It is therefore essential, before attempting the tactical training of machine guns, much less their tactical use, to organise them in batteries during peace. For this purpose it is suggested that when a battalion is brigaded with others, either for administration or training, the six or eight guns should be formed into one battery, under a selected field officer, who would be solely responsible for their peace training and tactical efficiency, and who would command them on manœuvres and on service. There would be little or no innovation in this, as our regimental signallers

are at present trained and commanded on similar lines under the divisional signalling officer. A cavalry brigade under the present organisation (1909) would have one battery of six guns, and an infantry brigade one of eight guns. The batteries of a Division would be commanded by the divisional machine-gun commander. While such organisation would in no way prevent the regimental machine-gun section being used with its own unit as at present, it would ensure a very high standard of tactical training, and enable the Divisional General to have a splendid reserve in his own hands for use at the critical moment of the fight as mobile as cavalry, in fire action more powerful than infantry, occupying the smallest possible front, yet capable of delivering a storm of some 10,000 bullets a minute with the maximum of accuracy and concentration.

The tactics in this book are based on the understanding that the machine guns are trained on this system, and that they are mounted on light, adjustable tripods and carried on trained pack-horses with the entire detachment mounted.

The failure of machine guns is due to two principal causes: (1) Insufficient training in working the guns; (2) Improper tactical employment.

It will be obvious that unless the gun can be depended upon to open fire with certainty and accuracy, and maintain it continuously without jamming or mechanical failure, it is useless to consider its tactical employment. The mechanism of the Maxim is somewhat complicated and delicate, and depends for its proper working upon

the exact adjustment of each part ; but no more so than any other piece of modern machinery—it is far less complicated and certainly far less delicate than the modern motor-car. Indeed, the comparison is analogous in several respects, as both require highly trained operators to ensure their smooth and continuous working, and each individual machine, whether gun or motor, has its own peculiarities and requires special study to obtain the best results. Both are capable of hard and constant employment for long periods, without breakdown or failure, in the hands of an expert.

No one would think for one moment of engaging a chauffeur for a high-class motor-car who had less than six months' training and experience, and who was not capable of stripping and adjusting the motors and effecting minor repairs. Apart from the mechanical knowledge, it must be remembered that the man who fires the gun, known as No. 1 in our service, has in his own hands the fire from 50 rifles, and on his own judgment and skill as a shot will depend the effectiveness or otherwise of this fire ; it stands to reason therefore that he should be chosen primarily for his good shooting, but, in addition to his skill in aiming, he must be a good judge of distance and possess considerable intelligence, initiative, and self-reliance ; for, although he will usually receive orders as to target, range, rate of fire, and the moment for opening or ceasing fire, it will often happen that he has to use his own judgment in these very important matters.

As the gun is generally required to move and come into action independently of other troops, it must find its own

scouts, who not only have to safeguard it from surprise when moving, but must be trained to select good positions whence it can come into action. For this reason the men of the detachment must be trained scouts.

To summarise :

- (1) Only marksmen should be chosen.
- (2) Trained scouts should be given the preference.
- (3) The whole detachment must be trained as range-finders and scouts.
- (4) The whole detachment must be proficient in judging distance.

- (5) Only strong men should be selected.

The strength of a machine-gun detachment is given on page 16. With the tripod mountings and pack transport the best *working* strength for a machine-gun section will be found to be the following :—

1 officer, 1 sergeant, 2 corporals, and 20 privates—that is, 1 N.C.O. and 10 men to each gun. It is almost superfluous to say that the whole detachment must be trained to work and fire the gun, and should have a very thorough knowledge of its parts and mechanism, and be experts at remedying failures and effecting minor repairs. Until the whole detachment are so trained and can detect the cause of any failure instantly and remedy the same in the minimum time required, it is useless to attempt tactical training in the field. The preliminary training will take from three to six months, according to the ability of the instructor and the time available daily for work.

It will be found that certain men of the detachment are far more skilful in laying and firing the gun than

others, and it is undoubtedly sound to specially train these men as gun-layers and to permanently allot to the two best layers the duties of Nos. 1 and 2 (*i.e.* the firer and his assistant). This should be the post of honour and coveted accordingly, and the two best gun-layers should be awarded a distinguishing badge. As no badge is authorised by our regulations, a lance stripe might be given to the best No. 1 of each gun.

In training the men of the section in the preliminary details of working the guns, the following points may be found of use. First frame a course of instruction for each day which will give systematic and progressive individual instruction in the following points: mechanism, name and use of every part, the working of the mechanism, care of gun, stripping and fitting, loading and firing; spare-part box, the name of each of its contents and recognition of every part *when out of the box*; failures, their recognition and remedy; gun-laying and firing, co-operation between layer, "No. 2" and observer. This course should last at least three months, provided not less than two hours a day are available. Drills may be combined with preliminary instruction at the end of the first month, and must aim at extreme quickness in dismounting the gun and opening *aimed* fire and remounting the gun again. The chief points in the preliminary training are that *all* the detachment are *equally* instructed. Training on the 20-yard range in barracks should take place during the third month, and special targets should be used to teach laying the gun, slow use of elevating gear and combined sights, traversing fire, fire control, rapid change of target,

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indirect fire. During this short-range practice the failures should be practically demonstrated, and firing on the range should never take place without making a few artificial failures to test the efficiency of the detachment. These failures should be introduced by the officer himself without the knowledge of the detachment, and should be so arranged as to occur naturally while firing. They should be timed by him in each case, and the record time for the remedy of each failure posted up in the barrack-room with the man's name. Artificial failures can easily be made by filing round the base of a cartridge so that it is torn off when fired, by loosening a bullet in a cartridge, by slightly flattening a cartridge so as to cause it to jam in the chamber, by wedging a cartridge in the belt, by introducing a blank cartridge, and by repacking the asbestos with dry packing. It will be found that by making two or three such jams every time the gun is taken out to fire the detachment will soon become expert in recognising and remedying failures.

The men should be taught that failures may be divided into two classes, viz. *avoidable* and *unavoidable*. The occurrence of an avoidable failure should be looked upon as a disgrace to the firer. The *unavoidable* failures so seldom occur that they are negligible.

The *avoidable* failures are those due to: (1) Fuzee spring adjustment; (2) Want of oil; (3) Dirt; (4) Want of water; (5) Bad packing; (6) Damaged ammunition; (7) Faults in feed due to badly filled, new, or damaged belts. Each machine gun will be found to work best with a certain weight of fuzee spring which can only be

found by trial, and this weight will change from time to time as the gun wears. The machine gunner cannot be considered fit for further training until he has become so familiar with his gun that he can instantly tell by the sound if it is working at its best ; just as a good chauffeur knows at once if his engines are running perfectly, and can instantly detect the slightest defect and make the necessary adjustment of the spark, petrol, or oil to ensure smooth running. The unavoidable failures are so few and rare that they will seldom be met with, and can be quickly remedied, except the breaking of an important part. Failures due to defective ammunition are extremely rare provided ordinary precautions are taken to avoid placing damaged cartridges in the belt. A breakage in any part of the lock can be remedied in a few seconds by substituting the spare lock which should always be *with the gun* in action. The breaking of any other part of the gun will be an accident of rare occurrence, and, provided the gun is properly inspected before use, may be more properly classified under accidents than failures. A modern machine gun in the hands of experts should never jam, while failure of automatic fire will be only momentary. Until this standard has been reached a machine-gun detachment cannot be considered fit to begin tactical training with ball ammunition. The Japanese in the late war were obliged to improvise the detachments for their hastily acquired machine guns ; and Captain Matsuda, who commanded the machine guns with Prince Kanin's Cavalry Brigade, says : "Whereas at the battle of Peu-silau on October 12th we had some

trouble after firing 1,800 rounds, on March 3rd the guns of one section after firing 11,000 rounds continued to work perfectly. *The gunners were absolutely familiar with their weapons.*" Lieut.-General Sir C. J. Burnett, K.C.B., remarked: "Like a good chauffeur, the Japanese machine gunner knows all the peculiarities of the weapon he fires, and can tell almost by instinct when anything is going wrong." It is almost superfluous to say that the men of the machine-gun detachment must never be changed or taken for any other work. Nothing has been said of the necessity for training the detachment in the all-important duties of scouting, range-taking, and horse-mastership during this period, but of course they are vital to ultimate success and must not be neglected.

Range practices will follow, and the peculiarities of the gun and its fire effect must be carefully taught during this period. The use of traversing and sweeping fire, combined sights, and observation of fire and the use of deliberate fire in imitation of rifle fire * should be perfected during range practice, so that they may be carried out under service conditions during the field practices which follow.

The tactical training should commence as soon as the field practices have been completed. The course for this should be carefully mapped out beforehand and should be based upon the principles given in Chapter II. and in the chapter dealing with the arm to which the section

* This requires considerable practice, and is done by striking the double button exactly as a telegraphist when sending a rapid message in "dots and dashes."

belongs, and should culminate in divisional manœuvres. This course might follow the following headings : *

- (1) Drill over rough country.
- (2) Selecting a position.
- (3) Selecting alternate positions.
- (4) Taking up a position.
- (5) Screening guns.
- (6) Making artificial cover.
- (7) Mutual support (movement and fire).
- (8) Indirect fire.
- (9) A battery working on a wide front in mutual support.

No drill for a battery has been authorised yet (1915), but the simple formations of a troop as laid down in *Cavalry Training* will be found admirably suited for a battery of machine guns on pack-horses with mounted detachment.

The writer is fully aware of the condition under which machine guns are officered and manned at present, and that a great error has been made in estimating the time required to train the detachments. The Germans, who have studied the question of machine guns with a thoroughness far greater than that of any other nation, have made them a separate arm of their service, under trained and permanent gunners, and they evidently consider that only specialists can attain the necessary efficiency.

However this may be, it is certain that the officer,

* Bostock's *Machine Gunners' Handbook* gives very good details on elementary instruction in tactical handling.

whether commanding a section or the batteries of a Division, must be a specialist and a highly trained one.

An officer commanding a company of Russian machine guns in the Russo-Japanese War, writing his experiences to the *Nouskin Invalid*, says :

"I have spent three years in studying machine guns, and consider myself proficient in their use, but I have always been convinced that the requisite skill and knowledge cannot be acquired in a shorter time."

The commanding officer who in the past looked upon his machine guns in much the same light as he regarded any other portion of his first-line transport—a necessary encumbrance taking away an officer and several men from their proper duties, and a source of anxiety when the regiment goes into action—would have regarded them with very different feelings if assured of their efficiency and relieved of the responsibility for their tactics and safety. That this is possible without altering the present organisation has been shown; that it is absolutely essential for their efficient use in war it is hoped to demonstrate in the chapters that follow.

CHAPTER II

GENERAL PRINCIPLES

"EACH arm has its special characteristics and functions, and is dependent on the assistance of others; the full power of an army can be exerted only when all its parts act in close combination, and this is not possible unless the members of each arm understand the characteristics of the other arms."

The above paragraph from *Field Service Regulations*, Part I., 1909, aptly illustrates a principle which should be impressed upon every serious machine-gun student, for the principles of machine-gun tactics are based upon those of the arm with which they are co-operating.

The machine gun must not be regarded as a separate "arm" in our service, nevertheless it possesses a power peculiar to itself; and until this power is studied and thoroughly understood, the principles that should govern its employment in the field cannot be grasped, and consequently its effective use is dependent on chance or accident, and for every success scored a dozen failures will occur, any one of which may be fatal. The preceding chapter has dealt with the peculiarities and power of the machine gun, and it will be seen that it possesses the fire effect of the infantry arm while it has several of the

characteristics peculiar to artillery; for instance, it is fired from a mounting by one man, and is moved from position to position by draught or pack animals.

We have seen that the chief characteristic of the machine gun is its power of delivering the "maximum fire from the minimum front"; this fire is of great volume and is highly concentrated, while it can also be made to sweep a wide lateral surface of ground. The gun's narrow frontage in action renders it easy to conceal, and when discovered it presents a very small and difficult target to the enemy's riflemen; on the other hand, when once discovered if it cannot be moved unseen to another position it is liable to suffer a prolonged and concentrated fire from the widely scattered riflemen of the enemy, to which it cannot effectively reply, and which must in time cause loss. Again, its range being limited, it is powerless against artillery except under special circumstances at effective rifle range.

The general principle governing its tactical employment is to support the arm to which it is attached. This will entail two main objects: (1) To assist the movement of your own arm; (2) To prevent the movement of the enemy.

Fire is the means by which we prevent the movement of the enemy in the first place, and then by keeping under his fire, *i.e.* obtaining "fire superiority," enable our own troops to move against him until near enough to assault him with hand weapons.

The volume and concentration of the fire of machine guns necessitates a large and vulnerable target, to gain

the best effect and avoid waste of ammunition ; and the object of tactics is to obtain such a target at close range from a suitable position, always remembering that fire is only justified when it directly assists your own unit in its immediate object. To obtain a suitable target of this description *surprise* is essential, and to effect a surprise it will be necessary to conceal the gun and its detachment in a well-chosen position.

Thus we see the three cardinal points for tactical success are—suitable *target* at close *range* from a concealed *position*.

FIRE EFFECT

Napoleon's maxim, that "fire is everything—the rest is of small account," is only applicable to the machine gun when the fire is *effective*. Nothing is so useless and wasteful as ineffective machine-gun fire, and the careful study of fire effect and how to obtain the best results is imperative with this weapon. The principles so ably stated in Colonel Mayne's excellent book, *The Infantry Weapon and its Use in War*, apply almost equally to machine guns, and should be carefully studied by machine gunners, particularly those chapters dealing with the employment of fire in the field.

We have already seen that the range of the machine gun is practically the same as that of the infantry rifle, but that the beaten zone is only half the depth and about half the width of the collective fire of infantry, partly owing to the rigidity of the mounting, and partly to the fact that the human error is greatly reduced by being

concentrated in the person of a single individual, instead of being spread over some 50 men of varying temperament, nerves, and aiming powers.

In addition to these factors, the fire from machine guns is always "collective" and "concentrated" unless deliberately dispersed by the firer, while infantry fire is always "individual" and "dispersed" unless controlled by fire discipline under a leader. Fire discipline and fire control are in the hands of one man—there is no need to point out the target to a scattered firing line, and there is no delay in passing orders down the line, or in the setting of 50 different sights for the correct elevation. Thus fire can be opened far more rapidly and accurately than with rifles, and can be at once directed on a fresh target without ceasing fire, while the effect can be seen by the firer, who can instantly change the rate or cease fire altogether.

The beaten zone is perhaps the most important factor in obtaining effective fire, and the following table, compiled from *Musketry Regulations*, 1909, gives the zone beaten by 75 per cent. at various ranges.

TABLE SHOWING THE EFFECTIVE ZONES WITH MARK VI AND MARK VII AMMUNITION AT VARIOUS RANGES

Range.	Mark VI Effective Zone.	Mark VII Effective Zone.
500 . . .	150	220
600 . . .	135	200
700 . . .	120	190
800 . . .	100	170
1000 . . .	70	140
2000 . . .	65	110
1500 . . .	60	70

It will be seen that the 75 per cent., or effective zone, is deepest at 500 yards, and gradually decreases as the range increases up to 2,000 yards; beyond this distance it increases again in about the same ratio up to 3,000 yards.

After 2,000 the beaten zone increases in depth, while the angle of descent of the bullets becomes so steep that the "dangerous space" is reduced to a minimum; consequently the zone beaten by 75 per cent. of shots is no longer the "effective zone," and it will be necessary to get the target within the zone beaten by the nucleus, or 50 per cent. of the shots. This zone at 2,500 yards range is about 50 yards in depth, so an error in estimating the range of more than 25 yards over or under the correct distance will render the fire "ineffective." Even at 1,500 yards the "effective zone" (75 per cent.) is but 60 yards deep, which only allows an error of 30 yards over or under the correct range—a very small margin, even when using a range-finding instrument, but without an instrument it is obviously impossible to "estimate" or "judge" the distance with sufficient accuracy to ensure bringing the "effective zone" on to the target.

For ranges over 500 yards it is absolutely necessary to know the range accurately or to find some other method of bringing the "effective zone" on to the target.

The machine gunner may be likened to the fireman with his hose-pipe, whose object is to bring the base of his jet of water to play on a certain spot some distance away from the nozzle of his pipe. He does not trouble

about the distance, he does not require to know the range; but, pointing the nozzle in the direction of the spot he desires to strike, he elevates or depresses it until he *observes* the base of the cone of water falling on the right spot, and then he holds his pipe so that it continues to fall where he desires; he does not trouble about the smaller streams and drops of water that fall short or go beyond, but devotes his whole attention to keeping the nucleus of the stream—the 75 per cent. or 50 per cent. zone—falling on his “target.” In precisely the same way the machine gunner must look upon his stream of bullets as a stream of water from a hose-pipe, and his object must be to cause the centre of that stream to play on the target, or, in other words, to bring the effective cone of fire on the target so that it is the centre of the beaten zone. This can be done by “observing” the strike of the nucleus of the shots and altering the elevation accordingly. On favourable ground fire can be observed by No. 1 up to 800 yards, but an observer with the aid of good glasses can observe fire on favourable ground up to 1,500. This observation of fire is the best method of obtaining the correct elevation at “effective” ranges (*i.e.* 1,400 to 600), if the ground is suitable. The procedure should be as follows: The range should be “estimated” by No. 1, who should then adjust his sight for 100 or 200 yards less elevation than the supposed distance, and fire “groups” of 10 to 20 shots; the observer saying “short” or “over,” as the case may be, while No. 1 alters the elevation between each group until he says “range,” when fire may be con-

tinued, still observed until the desired effect has been attained. No. 1 must be careful to fire his first group of shots short of the target, as they are much easier to locate than shots which fall "over." The observer must always estimate the *number of yards*, and must invariably say this, thus: "50 *short*" or "100 *over*," otherwise "No. 1" has nothing to guide him in correcting his sighting.

If the ground is not favourable for the observation of fire, or the range is too great, this method cannot be used, and it will be necessary to obtain the range by instruments; but it will not always be possible to do so, and it is necessary to find some other reliable way of ensuring that the target is within the "effective" zone.

Supposing the range to be estimated at 1,400 yards, the effective zone is about 60 yards in depth—therefore an error of only 30 yards in estimating the range can be permitted. There is but one way to overcome the difficulty, and that is by *increasing* the effective zone; and this can be done by using "combined sights," thus making two or more beaten zones which touch each other and overlap where the effective 75 per cent. of shots of both ends.

There are two ways of using combined sights:

(a) The "section" method.

(b) The "battery" method.

Vertical Searching.—With an estimated range of 1,400 yards, the sights will be set for 1,300 and aim taken; then the sights will be again set for 1,500 yards, but without

altering the original aim, and then "rapid" fire opened and the elevating wheel slowly turned to elevate the gun until the 1,500 yards sighting is aligned on the target. The result of this operation is to sweep the whole ground from 1,270 to 1,530 yards with effective fire; and if an error of 125 yards over or under the correct range has been made, the target is nevertheless brought within the effective zone by the combined elevations used. This is the best method for sections or single guns, and a section can vary this by one gun using 1,250 yards elevation and working up to 1,400, while the other gun begins at 1,350 and works up to 1,550. The choice of the amount over and under the estimated range must depend upon the ability of the person estimating the range and circumstances of the case, but less than 100 yards over or under should never be used.

Vertical searching is used on deep targets, such as a column on the march or artillery or other troops on a road or bridge. Also to search cover where the enemy are concealed, such as standing crops, spinneys, and small woods.

With two guns—vertical searching can sweep both ends of the target at once, the left gun using the lowest elevation and working up, and the right gun using the highest elevation and working down, their fire meeting and crossing in the middle.

Combined sights with one section are carried out by the left gun using 25 yards under and the right gun 25 yards over the estimated range; thus at 1,000 yards

the left gun would sight at 975 and the right gun at 1,025, thus sweeping 120 yards with effective fire, instead of 70 yards. With Mark VI ammunition, care must be taken not to use more than 50 yards between sights at ranges under 1,400, or the effective zone will not overlap, and a space will be left unswept by effective fire.

With Mark VII ammunition, 100 yards may be used between sights at ranges up to 1,200, and over this range 50 should be used.

With a battery—combined sights may be used in the same manner, but if 6 guns are available, 25 yards difference between the sights of each gun may be used if the total effective zone thus swept is sufficient to cover the probable error in ranging, with the advantage of a denser zone. With Mark VII ammunition 50 yards should be used at ranges beyond 1,200.

Combined sights are useless at ranges of 800 and under with Mark VII ammunition.

When commanding a battery or section and giving fire orders, the commander should place himself on the left of the left gun, as from here he can see all his "No. 2's," who can likewise see his signals.

The method of ordering combined sights with a battery is to give the command in the following manner, supposing the estimated range to be 1,000.

"*Combined sights*"—925—"difference 25."—The left gun repeats the command, and sets his sights for 925. The second gun repeats the order saying "950—difference 25," the next gun repeats the order saying "975

difference 25," and so on—each gun naming the sight he himself is using and the difference.

When each is ready to fire, "No. 2" holds up his hand until his section is ready, then the section-commander holds up his hand.

When the commander sees that all the sections are ready, he drops his hand and "No. 2's" give the word "fire" to their respective "No. 1's." A simple rule for calculating the effective zone with any particular difference of sighting is as follows :

• Multiply the number of guns *less one* by the difference in sighting, and add the effective zone of the gun. Thus : 6 guns at 1,000 yards, differences in sighting 25.

$$(6 - 1) \times 25 + 70 = 195.$$

The 6 guns sweep an effective zone of 195 yards.

If it is necessary to alter the range to conform to the movement of an advancing or retiring enemy, the method of doing this is to give the command "Left gun up 100"; in the case of a section using 50 yards difference.

The effect of this is to place the effective zone of the left gun, which is firing with the lowest elevation, *beyond* that of the right gun, thus increasing the range by 50 yards, but without ceasing fire with more than one gun.

To decrease the range—the reverse is necessary; thus : "Right gun down 100."

With a battery of 6 guns, the same method may be used, the order being "Left Section up 150," where the difference is 25 * yards between guns.

* NOTE.—*Cavalry Training*, 1915, apparently has a misprint of "Right" for "Left."

The number of yards ordered must always be such as will bring the new effective zone *beyond* the effective zone of the remaining guns without leaving a gap. This is obtained by multiplying the difference in sighting between guns by the number of guns in the battery.

Should it be necessary for the battery or section commanders to move from their positions on the left of their guns, they must invariably post a man in their place to repeat all signals, otherwise the "No. 2's" cannot see.

When it is necessary to observe fire from the flank or rear, the signals laid down in *Infantry Training*, 1914, para. 164, should be used.

Care must be taken with Mark VI ammunition not to use more than 25 yards between sights at ranges over 1,400 yards, otherwise there will be gaps between each effective zone, and the fire would be ineffective should the target happen to be at a spot between any two zones.

The methods of firing the gun are laid down in the official Handbook, but it may be added that in using "deliberate" fire the double button should be pressed irregularly so as to imitate rifle fire, and with a little practice a rate of 120 shots a minute can easily be attained.

This kind of fire, although it should seldom be used, will occasionally be serviceable in ranging for observation when it is desired to do away with the peculiar sound of the machine gun and thus not disclose its presence prematurely. In covering a retirement it may also be found useful to deceive the enemy into believing they are only opposed by riflemen, while reserving its

full fire power until a good target presents itself at close range.

TAKING UP A POSITION

Except under special circumstances, such as for covering fire or a demonstration, the battery will not move as such into position, but each section will be given its approximate place and move there independently, keeping touch, however, by signal or connecting files with the battery commander and acting in close co-operation with the other sections.

Positions are of two kinds, viz. (1) positions of observation, (2) positions of readiness.

The position of observation will usually precede the position of readiness, and the principal points are the concealment of the guns and detachments, the facilities for observing the enemy and for movement in any direction.

The position of readiness will be in the immediate vicinity of the fire positions, and the guns may be actually in position awaiting the target.

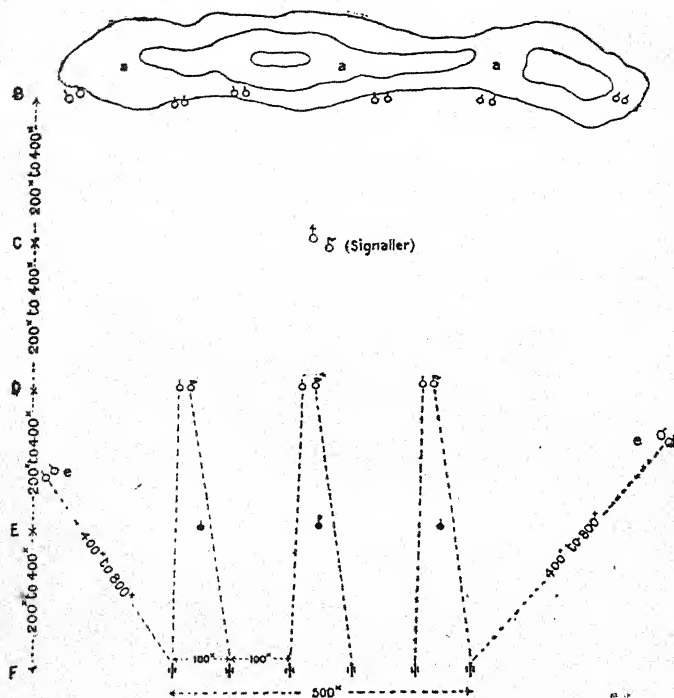
When moving alone on the march, scouts working in pairs must be pushed well out ahead and on the exposed flank or flanks, and they should be trained to use a system of signals to indicate the following: (1) "All clear"; (2) "Enemy in sight"; (3) "A good target in sight"; (4) "Cavalry" (prepare for); (5) "Artillery within range"; (6) "A good gun position."

Six simple and unmistakable signals can easily be arranged and learned during peace training, which might

prove invaluable in war, for "opportunity" is everything to the machine gunner, and is usually so fleeting

DIAGRAM III

TO SHOW FORMATION WHEN COMING INTO POSITION



aaa. The Position. B. Ground Scouts. C. Battery Commander.
D. Connecting files.
E. Section Commanders. ee. Flankers. E. Guns & Detachments.

as to demand instant action in order to obtain success.
On moving to occupy a position as a battery, the guns

will usually be in line at from 10 to 100 yards interval, with the section commanders leading their sections and the scouts well ahead; the flank guns must arrange for the protection of the flanks by scouts in the same manner.

Personal Reconnaissance.—The success of machine guns in war largely depends on the selection of the position for coming into action, and this is the duty of the battery commander. There are many points to be considered in performing this all-important duty, but the main consideration must always be the support of the arm which the machine guns are co-operating with, or in other words the immediate tactical situation.

The points to look for in the order of their importance are :

(1) Concealment for guns. (2) Concealed approach (3) Field of fire. (4) Cover for horses. (5) Line of retreat (covered). (6) Alternate positions.

If the guns have to be moved some distance from the horses, the question of ammunition supply and belt filling place must also be considered.

Every machine-gun commander is responsible for *personally reconnoitring* not only the gun positions, but the ground in the vicinity; and success or failure will largely depend on the thoroughness with which this is done.

The present war has specially pointed to the importance of personal reconnaissance, which enabled machine guns to very largely assist in repelling the German counter-attack at Neuve Chapelle on March 12th.

The Germans consider that ground scouts should never go into the proposed position, as they are likely to expose themselves to the enemy, and thus "give the position away," and, as already pointed out, "surprise" is the essence of success. They say that the commander of the battery or section, whichever the unit may be, should alone examine the position and select the place for his battery or section to come into action—and this is the right method as a general principle; but in broken or hilly country, where cover is abundant, and where the position is extensive, a battery commander can do no more than indicate generally the positions to be occupied by the sections, and it will then be advisable for the section commanders to personally select the positions for their guns. If the cover is good, the range-finders may next occupy the gun positions and proceed to take ranges. They must be most careful not to show themselves in the least, and should work from cover to cover, some distance from the gun positions and not on the same alignment. The ranges must be noted on proper range-cards, and when complete sent to the section commanders. In open country, where there is no good cover in the position, the scouts will only approach it sufficiently to ensure that it is not occupied by the enemy, and will then halt and find a good position for the guns to be dismounted; the commander, passing through the scouts, will then reconnoitre the position himself, and select the place for coming into action. There are two methods of taking up a position, which depend for their choice upon the proximity of the enemy

and the time at which fire is to be opened. The first is the "deliberate" method, when the guns are brought up and the ranges taken before the target appears. In this case cover is essential to success, and the guns must be most carefully concealed, the whole object being to surprise the enemy when the moment arrives, and thus concealment is of the first importance. The second method is used when the enemy is in the immediate vicinity, when the country is open and the position without cover, or when the position is within artillery range of the enemy. The guns unlimber and prepare for action immediately in rear of the gun positions, and as close to them as possible and completely out of sight of the enemy. The commander alone goes into the position, and, having selected approximately where each gun is to go, he stations them immediately in rear of their intended places out of sight and then creeps into the position himself and watches for the opportune moment; when this arrives, a blast on his whistle brings the guns up with a rush, no concealment is attempted, but, fully exposed, each gun opens fire on the nearest target. If the moment has been rightly judged and the range properly estimated, 60 to 90 seconds is sufficient time to obtain the desired effect, and before the enemy's artillery can get the range, a second signal from the commander sends the guns out of action again as rapidly as they appeared. This is one of the most successful methods of employing machine guns: there is no risk of being seen before the target appears, there is no "giving away the position" by careless scouts, and there is no chance that a powerful

pair of glasses will discover the guns in position before they open fire and turn the tables by surprising them instead. On the other hand, it requires very highly trained detachments and a vast amount of peace practice to ensure its success in war.

Alternative positions are always necessary when the deliberate method is used—and must be carefully practised in peace—the principal points to be observed being : (1) That the second position is suitable for bringing effective fire to bear on the enemy, and (2) that the gun is able to gain the position without exposure.

Scouts so often forget that they can work with ease where it is impossible to carry a gun; and unless the above conditions are fulfilled, the alternative position will be useless.

The place for dismounting the guns must always be as close to the fire position as possible without exposing the teams to fire or view; the reserve ammunition must be brought up to this spot, and precautions must be taken to prevent the teams being surprised from the flanks or rear if exposed. Machine guns should never be advanced for a short distance. If it is desired to obtain a closer range, nothing is gained by moving two or three hundred yards, while the guns are exposed to considerable risk. The guns are just as effective at 1,000 yards as at 800, and when a closer range is necessary they must await the opportunity for moving up to close range, *i.e.* 300 or 400 yards, where their fire may be decisive.

When the fire of one gun is sufficient for the tactical

situation, both guns should not be used. The gun not firing should be loaded and laid on the target that the first gun is firing at, and all orders for alteration of sights, change of targets, etc., should be carried out exactly as if it were firing, and everything should be ready to instantly open fire.

Should the gun that is firing stop for any reason other than an order to do so, the second gun must instantly open fire.

This is the only means of absolutely eliminating stoppages or failures, and should always be done where the tactical situation permits.

The section of a battery may, in the same way, reserve fire, in readiness to instantly take up the fire of any gun that may have an involuntary stoppage.

COVER

Cover may be of two kinds :

- (1) *Cover from fire.*
- (2) *Cover from view.*

Cover from fire must be proof against the projectiles likely to be used against it—that is, against rifle fire and shrapnel. “Cover from fire” should also be “cover from view” if possible ; it must be inconspicuous, and should be of the same colour and material as the background and locality. It must be as low as is compatible with command, and must never be on the skyline. The following points in the order given constitute good “cover from fire” ;

- (1) Bullet proof.
- (2) Good field of fire.
- (3) Invisibility.
- (4) Protection from enfilade fire.
- (5) Good line of retreat (under cover).

"Cover from view" is often not cover from fire, and must be used with great caution; it is the principal means by which guns are brought up to the fire position without the enemy's knowledge, thus effecting a surprise. Cover may be either (1) natural, (2) artificial, (3) a combination of both.

"Cover from fire" will generally be artificial or a combination of natural and artificial cover, because natural cover will seldom be found that is suitable for machine guns, although *partial* cover from fire may often be found behind a bank, a rock, or in a ditch.

"Cover from view" will generally be natural cover, and will be used to conceal the guns while approaching a position to occupy it, and, when in position, to effect a surprise. When used in position to effect a surprise, it must be remembered that the moment the guns open "rapid" fire, the cover is no longer any protection—indeed, it may be a source of great danger should it be isolated or conspicuous, such as a patch of scrub in a plain, or a clump of bushes on a hillside, as it will form a mark to aim at for every gun and rifle within range. "Cover from view" may be also "cover from fire," as when folds in the ground or a ravine are used to conceal the guns. It may be also artificial cover, such as screens of boughs and brushwood as used by the Japanese at

Liao-yang to conceal their march, or to hide guns in position. Hurdles covered with grass, reeds, bush, or branches of trees to closely imitate the surrounding growth, and placed as screens to hide the guns until the moment arrives for opening fire, will often prove a most valuable method of concealing guns in position, and under favourable circumstances the guns may even open fire from behind the screens without being discovered. This method requires constant practice in peace to attain success on service—indeed, the necessity for the most thorough peace training and constant practice in all the details of bringing guns into action, making cover, taking up alternative positions, retiring under mutual support, etc., cannot be too strongly urged on section commanders. Little ammunition is available for practice in our own service, it is true, but there is nothing to prevent constant practice in this vital duty of the machine gunner; and, by getting a few men to represent the enemy, with an intelligent officer and a pair of good glasses, most valuable help can be given by criticising the manner the guns are handled, and the amount of exposure or concealment of the gun and detachment in taking up a position or making cover.

Artificial cover may be either excavated or built up or a combination of both. Excavated cover will usually take the form of a pit of sufficient size to hold the tripod, ammunition, and three men, and deep enough to conceal the gun and men not only from view, but from fire at "effective" range. This form of cover is particularly good on a level plain, the muzzle of the gun being just

above the surface of the ground. The rear side of the pit may require to be enlarged to take the long leg of the tripod where time is limited and the pit has not been made large enough to take the tripod in any position, but it is advisable to make the pit of sufficient area to allow the gun to be worked in any direction. With an adjustable tripod, the pit should be so deep that the gun is completely concealed below the surface of the ground, and it is only raised when it is intended to open fire.*

The best form of gun pit is one in which the centre is not excavated and is used to form a platform from which to fire the gun, the pit being really a circular trench dug all round it. At the rear end of this "pit"—a short communication trench leads to a deep trench or "dug out" where the remainder of the team, etc., can live.

If this pit is dug carefully and the soil removed or screened, and the grass or other growth left on the centre platform, it not only cannot be seen at 200 yards, but it is also invisible to aeroplanes.

Other forms of cover consist of epaulements, trenches, sangars, etc., which will not differ essentially from those given in the *Manual of Military Engineering*. In all types of "cover from fire" care must be taken that the cover is high enough to protect No. 1 from bullets fired at ranges up to 1,400 yards, taking into consideration the angle of descent of the bullets at that range and the distance of No. 1 from the cover.

* Two types of emplacement for a machine gun are shown on Plate 15, *Manual of Field Engineering*, 1911.

Cover can seldom, if ever, combine all the points enumerated here, and it will lie with the section commander to discriminate between them and decide what points he will sacrifice in favour of others more important : thus, it may be necessary, where concealment is the chief object, to forgo "cover from fire" at the longer ranges in favour of a low parapet or even none at all. It is only possible to indicate in outline the principles that should be followed ; practice in training and the experience thus gained alone will make the reader an expert.

Shields will be found of great value in the final stages of the battle, when machine guns are pushed up to close range to assist in the final assault. They are too heavy to carry on the guns, and should be with the ammunition in the first-line transport, where they are easily obtained if required.

COVERING FIRE

Machine guns will often be used to cover the advance of infantry from "long" to "effective" range when the artillery is still occupied in the artillery duel and the infantry first come under effective rifle fire from the enemy. The ease with which they can instantly open and cease fire, concentrate on a particular spot, or sweep a line of trenches, renders them particularly suited for this purpose, and the Japanese constantly used them to keep down the enemy's rifle fire in this manner during the late war.

The narrow beaten zone enables them to fire safely over the heads of advancing infantry from all ranges

beyond 800 yards, provided the infantry are at least 200 yards from the enemy fired at. A study of the table of trajectory in the Appendix to *Manual of Military Training* will enable the machine gunner to decide the circumstances under which the fire is safe in each case.

The following method ensures the safety of infantry at all ranges over 800 :

Obtain the exact range by range-finding instrument to target. Make the necessary allowance for the " error of the day " and the known error of the gun.

Place the sighting so obtained on the tangent sight and align the gun on the target. Now raise the elevation on the tangent sight by 250 *without altering the laying of the gun*, look over the sights and note the spot upon which the sights are now aligned. Fire may now be opened, *keeping the sights on this spot*, and may be continued with perfect safety to the troops in front until the leading line is seen *to reach the spot upon which the sights are set*, when fire must cease, or the gun will be elevated to fire over the enemy's heads. This not only demoralises the enemy—but prevents his being reinforced.

Care must be taken that a worn barrel is never used for overhead fire, and that the mounting is firm and the gun has no undue play on it.

Positions on the flanks and if possible to the front of the advancing infantry will render covering fire most effective, but these positions will rarely be possible. The first consideration is the concealment of the guns from the enemy's artillery, which can easily silence them if exposed. It is also necessary that the positions selected

should be sufficiently commanding to enable the battery commander to see the attacking infantry during the whole advance, so as to fire only when they are moving, while at the same time he must be able to see the position of the enemy's trenches and thus direct the fire on any part desired.

INDIRECT FIRE

The best method of using covering fire in the early stages of the attack is by *indirect fire* from the reverse slopes of a hill or from behind a ridge or other feature. This is not difficult to carry out, and in no way lessens the accuracy of the fire or endangers the troops in front, as the following experiment will prove.

EXPERIMENT IN INDIRECT FIRE

The following is an extract from an article by First Lieutenant A. E. Phillips of the 10th Cavalry, from the *Journal* of the United States Cavalry Association for July 1909 :

"To determine how many, if any, of the bullets from the machine gun would strike troops in front of an assumed 'hill' over which the gun was to fire, canvas frames were used to represent such objects, the targets being concealed from view.

"The target consisted of a strip of target cloth 6 ft. high and 15 yards wide, along the bottom edge of which is pasted a row of kneeling figures with an interval of a yard from centre to centre. Across the target, and parallel to its top edge, was drawn a narrow black line tangent to the tops of the heads of the figures. Value

of hits on any figure = 5; value of hits on the cloth below the line = 3; value of hits on the cloth above the line = 1. Canvas frame, 8 ft. high, placed 200 yards in front of the gun. Rapid fire :

First Experiment

Range 800 yards

No. of shots.	No. of Hits.				Remarks.
	Figs.	5's.	3's.	Total.	
30	5	10	12	22	Line of sight was 5 ft. below top of obstruction. All shots over.
30	8	10	9	19	

Second Experiment

Range 1,000 yards

No. of shots.	No. of Hits.				Remarks.
	Figs.	5's.	3's.	Total per cent. of figs. hit.	
30	9	11	4	60	Line of sight was 3 ft. below top of obstruction. All shots over.
30	12	17	7	80	

Third Experiment

Range 1,200 yards

No. of shots.	No. of Hits.				Remarks.
	Figs.	5's.	3's.	Total per cent. of figs. hit.	
30	2	2	5	13	Line of sight was 3 ft. below top of obstruction. All shots over.
30	4	5	13	27	
30	8	11	9	53	

"It will be noticed no 1's were made. Assuming the height above the ground of the average mounted soldier as 8 ft., had a troop of cavalry mounted been 200 yards in front of the machine guns in the third experiment, the line of sight would have struck about the backs of their horses, and all bullets would have gone over the riders with at least 4 feet to spare, as proved by the experiment. . . . The troop mounted could have moved forward to within 100 yards of the target and would not have been struck by the bullets."

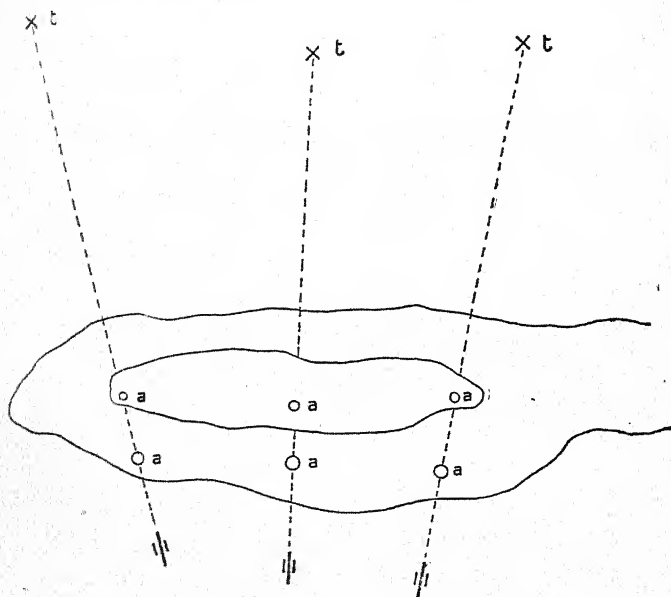
The methods of carrying out indirect covering fire will vary according to the nature of the position selected and the way the guns are to be laid.* This is one of the few occasions when a battery or two may have all their guns in line close together. If the slope is a steep one, they may be pushed up close to the crest, but on a gentle slope they must be placed sufficiently far back to avoid the forward effect of shrapnel bursting on the crest line.

The battery commander will select the position for the guns and will then give each gun or section a section of front to fire on. The method of marking off this section is as follows: two iron rods about 3 ft. long for each gun are painted white, and are then "laid off" from the gun to the target, in an exact line, the first being on the near slope a few yards short of the crest; the next on or just behind the crest line. By aligning the gun on the rods, fire is brought on the centre of the target; should traversing fire be required, the limits may be marked by similar sticks on either side.

* See page 55.

There are three methods of laying the gun. (1) By auxiliary aiming mark when available. (2) By graticule reading when the target can be seen from high ground

DIAGRAM IV
TO SHOW METHOD OF LAYING BY AIMING POSTS



aa. Aiming Posts (about 15' apart and some distance in front of gun.)
ttt. Targets.

behind the gun. (3) By the Satara Director when the first two methods cannot be used.

The first method can be used when there happens

to be an auxiliary aiming above the target that can be seen from the gun. Take the range from gun to target, and take a graticule reading with the "Director" or graticuled glasses, between the target and the aiming mark, and lay the gun on the aiming mark with the sights set at the range after deducting the graticule reading. This will bring the fire on to the target.

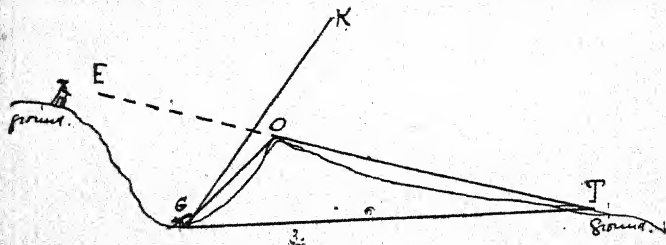
The second method is as follows :

INDIRECT FIRE FOR MACHINE GUNS BY GRATICULE

Requirements

1. A Graticule Card or Glasses.
2. Range Table for Machine Gun.
3. Range from Gun to Target.
4. Range from Obstruction to Target.
5. A man in position somewhere so that he can see the target and the aiming mark on the obstruction in a line.

DIAGRAM V



Method.—With stones or posts lay the gun in the direction of the target in the usual manner.

Send a man to any position where he can see the aiming mark on the top of the obstruction and the target in a straight line.

Lie down in rear of the aiming mark "O," facing the gun "G," and take a graticule on the man's eye "E" and the gun having the zero graticule on the man's eye.

At this stage the gun should be moved if necessary so as to give a reading of at least 300 x less than the actual range GT.

From the Range tables convert this reading into degrees and minutes, thus obtaining the angle GOE.

From the same table the tangent elevation for the range GT can be found, *i.e.* the angle TKG. If the gun is laid on O with the elevation O GK, it will strike the target "T."

By Trigonometry we know that the sides of any triangle are proportionate to the sides of their opposite angles.

Therefore in the triangle GOT,

$$\frac{\sin OGT}{\sin GOT} = \frac{OT}{GT}$$

And as the sine of an angle = sine of its complement

$$\sin GOE = \sin GOT$$

$$\text{Therefore } \frac{\sin OGT}{\sin GOE} = \frac{OT}{GT}$$

In small angles, *i.e.* anything under about 10 degrees, the sines of angles are for all practical purposes proportionate to the angles themselves. Therefore practically—

$$\frac{\text{Angle OGT}}{\text{Angle GEO}} = \frac{\text{OT}}{\text{GT}}, \text{ i.e. angle OGT} = \frac{\text{OT}}{\text{GT}} + \text{angle GOE.}$$

The angle $\text{OGK} = \text{angle TKG} - \text{angle OGT}$.

Therefore the tangent elevation for laying the gun on O (OGK) equals the tangent elevation for the range (KGT) — $\frac{\text{OT}}{\text{GT}}$ + angle GOE.

From the above, the following formula is evolved :

$$\angle \text{OGK} = \angle \text{TKG} * - \frac{\text{OT}}{\text{GT}} + \angle \text{GOE}$$

When the angle TKG is found, convert by means of range tables into a range and lay gun with that elevation on O.

The third method entails the use of the Satara Director which is also graticuled.

This will be found a simple, rapid and extremely accurate method of bringing indirect fire on to a target, at any range and under all circumstances, when the bullets will clear the obstruction. If the bullets will not clear the obstruction, the instrument at once shows this by giving a negative result.

By the aid of an ordinary clinometer and the scales reproduced in the book, the method can be tested practically.

THE "SATARA" DIRECTOR

(Oddin Taylor Patent)

This instrument, which will shortly be put on the market, is shown in the illustration (page 62). It consists

* Correction for day to be allowed in deciding this angle.

RANGE TABLE FOR MAXIM GUNS FOR MARKS VI AND VII
AMMUNITION

Range (Yards).	Angle of Tangent Elevation on the Gun.		
	Mark VI.		Mark VII.
	Gun Maxim '303".	Guns Maxim '303" converted Mk. I and II.	Guns Maxim '303" and converted Mk. I and II.
	° '	° '	° '
100	10°5'	10°0'	12°5'
200	14°5'	15°0'	15°0'
300	21°0'	20°5'	18°5'
400	27°0'	26°5'	22°5'
500	35°0'	34°0'	27°0'
600	44°0'	43°0'	32°5'
700	56°5'	55°0'	38°5'
800	1 10°0'	1 7°5'	46°0'
900	1 23°0'	1 19°5'	54°0'
1,000	1 38°0'	1 33°5'	1 3°5'
1,100	1 53°5'	1 48°5'	1 14°5'
1,200	2 11°0'	2 6°0'	1 27°0'
1,300	2 28°5'	2 22°5'	1 41°0'
1,400	2 49°5'	2 43°5'	1 57°0'
1,500	3 9°0'	3 2°0'	2 15°0'
1,600	3 30°0'	3 22°5'	2 35°0'
1,700	3 55°0'	3 45°5'	2 58°0'
1,800	4 22°0'	4 11°5'	3 23°5'
1,900	4 50°0'	4 38°5'	3 52°0'
2,000	5 20°5'	5 8°0'	4 24°0'
2,100	5 53°0'	5 35°5'	5 0°5'
2,200	6 29°5'	6 6°5'	5 41°0'
2,300	7 11°0'	6 42°0'	6 26°0'
2,400	7 57°0'	7 19°0'	7 17°0'
2,500	8 46°5'	8 0°0'	8 14°0'
2,600	9 39°0'		9 18°0'
2,700	10 37°0'		10 30°0'
2,800	11 37°0'		11 50°5'
2,900	12 41°0'		

NOTES.—(a) Heights of trajectory and angles of descent may be taken as being the same as for the S.M.L.E. Mark III rifle.

(b) Converted guns are not sighted for ranges beyond 2,500 yards.

of a flat metal plate with folding sights, SS, at opposite ends of the top edge, and a casing, C, containing a pendulum which, when hanging freely, keeps in a vertical position, so that when the sights are aligned on any object, the reading given by the index on the graduated arc (seen through the small glass window in the cover) gives the vertical angle between the object and the horizontal. By pressing the knob K the pendulum can be unclamped, and, if at the moment when the object is sighted this knob be released, the pendulum is held so that the reading can be taken.

The body of the instrument has engraved on it various tables and diagrams, viz. :

(a) The diagram 1, which shows the difference in level between any object and the observer when the angle and range to the object have been taken ; thus, suppose the range be 1,000 yards and the angle $1^{\circ} 30'$, the diagram at once shows the difference in level to be 80 ft. Similarly, if the difference in level and the range be known it is quite easy to read off the angle to the object.

(b) The tangent angle scale 2, which shows at a glance the tangent angle corresponding to any range or *vice versa*.

(c) The table 3, which, together with the writing space W, serves for noting down the readings taken and deducing the results.

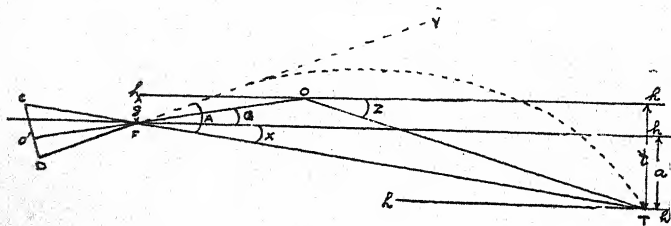
(d) The scales 4 and 5, which are simply graticules, the usual disc and cord being attached for use with them.

(e) On the cover of the pendulum case is engraved a table of Effective Zones.

Practical trials have shown that with this instrument the target can be hit at the first burst at any range, and a minimum of time is required in making the required observations and working out the elevation for the gun, no calculation other than simple addition or subtraction being required. The illustration shows an instrument graduated for use with Mark VI ammunition, but they will be obtainable for either Mark VI or Mark VII ammunition.

The theory underlying the use of this director is dealt with fully in a booklet printed for use with the instrument, and is very briefly as follows :

DIAGRAM VI



In above figure T represents the target, O the top of the obstacle visible from the gun, and DF, DC represent the gun and tangent sight to an exaggerated scale for the sake of clearness; h, h, h , are horizontal lines drawn through the top of the obstacle, the gun, and the target.

Now, if there were no obstacle, the gun would be sighted on T, so that CFT would be the line of sight, and DFY the line of departure of the bullet. Without

moving the gun, consider the obstacle to be interposed and lower the tangent sight until the visible top of the obstacle is sighted; then $O'FO$ becomes the new line of sight.

Now, the angle DFC is the tangent angle for the range FT , but by sighting on to O instead of T we get the new angle $O'FD$. Thus it will be seen that if we aim at the top of the obstacle we must use a tangent angle, less by the amount CFO' than the angle which would have been employed had there been no obstacle.

But the angle $CFO' = G + X$ where G = angle from gun to obstacle and X = angle at the gun between the target and the horizontal.

The angle G is measured by means of the instrument, and it only remains to find X .

Now, for this it is necessary to go to O and take the angle Z by means of the instrument and to take the ranges OF and OT .

But the difference in level between T and $O = t = OT \sin Z$.

Similarly the difference in level between O and $F = g = OF \sin G$; and by means of diagram 1 the value of t and g can at once be read off, because both the ranges and angles are known.

Now, $a = t - g$ and $\frac{FT}{a} = \sin X$.

But FT is very nearly equal to $OF + OT$, as all the angles are very small.

Therefore from diagram 1 the angle X can be found.

Now, the required tangent angle $O'FD = A - (G + X)$ where A = tangent angle for range FT .

From scale 2 look up the value of A for the sum of the ranges OF and OT, and by subtracting $G + X$ we get the required tangent angle, which can be converted into range by means of the scale 2.

If the target is above the gun, the same reasoning holds good, but the required tangent angle will be found to be :

$$A - (G - X) \text{ instead of } A - (G + X)$$

If the ground be approximately level, the angle X disappears and we get the simple result :

$$\text{Required elevation} = A - G..$$

This case is an interesting one which is liable to happen frequently in flat country, and to get the required elevation it is only necessary to take the total range to the target, find the tangent angle from scale 2, subtract the angle to the obstacle (G), and find the range corresponding to this new angle from scale 2.

In this case also the gun itself can be used to take the angle to the obstacle; it is swivelled round till it faces away from the obstacle, and is levelled by means of a spirit level or the director itself which can be stood on it, and the gun moved till the pendulum points to zero. The tangent sight is then run up until, by sighting backwards the foresight and tangent sight are aligned on the top of the obstacle; the range shown on the tangent sight is then read off and converted into an angle by the scale 2.

The table 3 shows the exact order and method of working with this instrument, but an example will help to make it clearer :

Assume these conditions :

Range from obstacle to target = 1,500 yards.

Angle from obstacle to target = 1° down.

\therefore from diagram 1, $t = 77$ ft.

Range from obstacle to gun = 200 yards.

Angle from obstacle to gun = $2^\circ 30'$ down.

\therefore from diagram G = 25 ft.

\therefore the difference in level between gun and target =
 $(t - g) = 77 - 25 = 52$ ft.

Total range = $1,500 + 200 = 1,700$ yards.

From diagram 1 the angle X corresponding to 55 ft. at 1,700 yards = $40'$ approximately.

Now, the required tangent angle = $A - (G + X)$, as the target is below the gun.

From the scale 2 we see that the tangent angle A corresponding to a range of 1,700 yards = $3^\circ 55'$.

Now $G + X = 2^\circ 30' + 40' = 3^\circ 10'$.

\therefore the required elevation = $3^\circ 55' - 3^\circ 10' = 45'$, and from scale 2 this is seen to correspond to 600 yards, which is the elevation required on the tangent sight when aiming at the top of the obstacle, to hit the target.

Angles of elevation are read plus, angles of depression minus; T being the target, G the gun, and O the observer.

Before firing it is necessary to ascertain that the trajectory will clear the intervening crest—*i.e.* see that the angle of slope to the top of crest is less than the angle of QE at which the gun is likely to be fired. If there is an obstacle some distance in front of the gun, to ascertain if the trajectory will clear it, make a liberal estimate of



or tactical points. To act as escort to artillery and to assist in the pursuit. To cover a retirement.

With Infantry.—To cover the first advance with fire. In attack they should be held back until the last reserve has been thrown in, when they must be used to bring an overwhelming fire to bear on the point selected for assault. Owing to their narrow beaten zone and great accuracy, they can safely fire over the heads of prone infantry within 200 yards of the position. A Japanese officer who commanded a machine-gun battery at the battle of Mukden said on one occasion he "continued this fire until their attacking infantry were within 30 metres of the enemy's position." *

They may also be used to reinforce threatened points, when their mobility will enable them to arrive at a distant part of the battlefield with the rapidity of cavalry. They should rarely be used in the firing line, where their fire, being dispersed, is less effective than an equal volume of rifle fire, and where they are at once the target for every rifle. Machine guns can never engage artillery, and should avoid engaging other machine guns or firing on a line of skirmishers.

They are particularly useful at night with the outposts, and can be trained by day on roads, defiles, or bridges, and thus can be used in the dark to sweep the approaches with accurate fire.

The Golden Rule for Machine Gun Tactics may be thus expressed :

"CONCEAL YOUR GUNS, UTILISE COVER, AND OPERATE BY SURPRISE—FOR SURPRISE IS THE ESSENCE OF TACTICAL SUCCESS."

* United States Official Report of Russo-Japanese War.

CHAPTER III

EMPLOYMENT IN THE FIELD WITH THE INDEPENDENT CAVALRY

The Germans have resolutely adopted the plan of attaching machine guns to cavalry, and they seem thus to understand the modern combination of fire and shock tactics. To the machine gun the fire action, to the horseman the moral action—so much the more easy and productive of results as the machine gun is the more powerful.—CHIEF OF 2ND BUREAU, French General Staff.

SINCE this was written it has been generally recognised by the leading military authorities of the world that the machine gun is essentially a cavalry weapon; and Colonel Zaleski in a recent article on the lessons of the Russo-Japanese War goes so far as to say, "Even their addition to squadrons cannot be carried out too rapidly, and this weapon would now appear to be indispensable to cavalry."

The truth of this statement is obvious to the student of modern tactics who is also acquainted with the machine gun as organised and equipped on the Continent and in the United States, where it is as mobile as the cavalryman himself and as quick in coming into action.* When its true rôle is understood and its tremendous fire power made full use of, it will go far to render cavalry indepen-

* See pages 12 and 13.

dent of the rifle, and to restore to them that dash and independence of action which made them the terror of the battlefields of the past.

The following extract from an article in *The Times* newspaper of August 23rd, 1905, by their special correspondent with the Japanese Army in Manchuria, shows the necessity for machine guns by emphasising the danger of training cavalry to fight as infantry :

"The prime value of cavalry lies in its mobility. As an actual fighting unit in battle a body of cavalry is much inferior to an equal body of infantry. The discrepancy is less marked if the cavalryman carries a rifle, but there is always the encumbrance of the horses, which require the attention of one man in every four when the rifle is employed. It being postulated that tactics evolve themselves into the effort to obtain a superiority of rifle fire, it is evident that the necessity of dispensing with one quarter of a body of mounted riflemen before their weapons can be brought to bear greatly lessens the value of that body. On the other hand, the mobility of the mounted rifleman compensates for his comparative ineffectiveness to such a degree, it is believed in the British Army, that elaborate arrangements have been made for the provision and training of what is known as mounted infantry. Granted the value of mounted and mobile men as an auxiliary to infantry, the question arises, What is the weapon with which they shall be armed, and what the nature of the training to which they shall be subjected ? These things depend upon whether the mobility of a mounted man is regarded as secondary

to his function as a rifleman, or whether his weapon is merely adapted to his mobility. In other words, are mounted men wanted for their riding or their shooting ? The arming of our cavalry with rifles, and certain modifications in its training, together with the formation of corps of mounted infantry, show that those who held the ear of the Secretary of State for War a few years ago pinned their faith to the superior value of shooting, and regarded mobility in a mounted man only as a means to an end. If we turn to the conflict now proceeding in Manchuria, it is found that in one respect it differs considerably from other great wars, particularly those which have been fought on level ground. Cavalry has been conspicuous not by its absence, but by its utter and astonishing ineffectiveness. From Liao-yang northwards both armies have occupied part of the level plain traversed by the Liao River. The right of the Russian Army and the left of the Japanese have faced each other for nearly twelve months, in country as flat as a billiard-table and as suitable for cavalry evolutions as any of the low countries in which the famous leaders of last century made their reputations. Here have been conditions ideal for the employment of shock tactics ; a veritable jousting-ground where the vaunted Russian cavalry might have run a-tilt at the sword-worshipping Japanese. Yet no single instance has been recorded of combat between mounted men, and to the best of my belief none has occurred.

"Is it, then, that those who advocate the substitution of mounted infantry for cavalry are in the right ; that the lancer, hussar, and dragoon of picturesque memory

have become obsolete in these days of the breechloading rifle? Almost it would seem so. But for two important considerations, the case for mounted infantry might well be deemed as proved. These considerations, however, are of such a nature as to lead the observer to directly opposite conclusions: to conclude actually that cavalry pure and simple is as useful to the army of to-day as it was to the army of Napoleon's day; and that it is totally erroneous to suppose that mounted infantry can be an efficient substitute for cavalry. The cause of the effectiveness of Japanese cavalry is not far to seek. The men are the most intelligent of Japanese soldiers, and their many fine patrol performances are evidence of the sound methods in which they have been trained. Their weakness lies in the poor quality of the horses, and the fact that the Russian cavalry outnumbers them by six to one. Marked inferiority of force, in all forms of rivalry, is a fatal disadvantage, and it is for this reason that the Japanese have failed to shine in the rôle which experience has assigned to cavalry. The Russian cavalry, on the other hand, is estimated to number 30,000 sabres, a force of mounted men which, in the circumstances, ought to have made the lives of the Japanese commanders on the flank of the army a burden to them. Instead of which, life in the rear of the Japanese front has been a sinecure, a positive *dolce far niente*, undisturbed even by the distant flash of any of these sabres. Is this a proof that, if the sabres had been rifles, something could have been accomplished? Very far from it. It is because the Russian cavalry, armed as it is with rifle and—shade

of Seydlitz!—bayonet, is trained to fight only on foot, thereby throwing away its most valuable weapon, mobility, that it has proved no more effective in the field than a flock of sheep. That the microscopic force of Japanese cavalry has held the Russian throughout the campaign—an exceedingly remarkable performance when it is remembered how indifferently the Japanese are mounted—testifies clearly enough that there must be something futile about the arming and training of the Russians. . . . They failed as cavalry and they failed as riflemen, and the reason of the failure was that they are neither fish, flesh, fowl, nor good red herring. They are organised as cavalry, but have been trained to dismount on service. In peace they are armed with lance and sword, and in war they are asked to fight with rifle and bayonet. Truly an absurdity, worthy of one of those nebulous units evolved by our own Parliamentary reformers. Last month Mishechenko, marching forty-five miles in four long summer days, again descended on the Japanese flank, accounted for a couple of companies and a field hospital, frightened a number of Chinese carters, and stopped before a thin line of infantry guarding the approaches to Hsin-minting, where Japanese supplies are stored sky-high. Had he known it, he was within an ace of picking up a number of distinguished British officers, besides newspaper correspondents, and a famous general whom the Emperor William has specially delighted to honour. But an inferior number of riflemen checked the advance, and no use was made of the mobility of the column, except to retire by a circuitous route. . . . Sq

far as my information goes, the Russian cavalry west of Mukden never once took the offensive during the battle. Strapped up with rifle and bayonet, they are incapable of wielding the sword; their lances, except in the case of a small proportion of the Cossacks, have been left in Russia. So it was useless to contemplate old-fashioned cavalry work. But the Japanese communications were an easy mark, and it is one of the most singular features of Russian tactics that they did not avail themselves of so glaring an opportunity. Even as mounted infantry they should have been able to destroy Nogi's communications. Yet they never made a single attempt at interference.

"The deduction is obvious: either the training or arming must be at fault. When a mounted man dismounts he sacrifices his mobility to become a weak infantryman. The Russian cavalry has been trained to fight dismounted, and the result is that the Russians have divested themselves of the one arm which, many keen observers believe, might have availed to turn the tide in their favour. The battle of Mukden was a great defeat, though not an overwhelming disaster. At one period the result hung in the balance, and it is no wild statement to say that if the Russian cavalry had been trained and armed in orthodox cavalry fashion, and handled in a manner consistent with cavalry tradition, Mukden would have proved a drawn battle. It is my firm belief—a belief shared with many others more competent to judge—that if French, with 10,000 British cavalry, had been given a free hand early in the war on

the Russian side, there would have been no necessity for Kuropatkin to retire from his strong position at Liao-yang, and I have no less hesitation in saying that if the same able commander, with such a cavalry force as I have mentioned, had been attached to the Japanese side at Liao-yang or at Mukden, there would be no Russian army in Manchuria to-day. *En passant* it may be remarked that if the Japanese cavalry had been capable of pursuit at Mukden, it would have proved a terrible thorn in the already bleeding Russian side. As it was, the Japanese were out-numbered and hence completely ineffective."

If the writer of this article is correct in his deduction of the lesson to be learned by cavalry from this war—and his opinion has since been confirmed by military opinion generally—it would appear that the machine gun is just the one thing needed to give cavalry the fire power of infantry, while retaining mobility and their proper rôle in all the circumstances of the modern battlefield. It will therefore be instructive to study the possibilities of machine guns with cavalry in the various situations which may arise in the course of a campaign.

The use of machine guns in certain stages of an action is similar whatever the scale of the operations may be; and, to avoid unnecessary repetition, such phases as the Pursuit, the Retreat, etc., have only been dealt with once. The tactics of the various bodies of cavalry are based on the principles laid down in the Training Manuals, the Independent Cavalry being treated in this chapter, the Divisional and Protective in the next.

While the opposing armies are still at a considerable distance apart, the Independent Cavalry will gain touch with the enemy and endeavour to obtain such information as may clear up the strategical situation and afford the main army strategical freedom of action; they may also carry out special missions, such as cutting the enemy's communications, carrying out raids, or seizing important strategical points. This can usually only be accomplished when the enemy's cavalry has been defeated. It will therefore be the first duty of the Independent Cavalry to seek out and defeat the cavalry of the enemy in order to be free to carry out its mission.*

When the first consideration is to obtain accurate information a strong body of cavalry may be required. As strong a body as possible will be sent forward on the mission of reconnaissance. The nation that is weak in cavalry will therefore do well to make up for this deficiency by the employment of great numbers of machine guns so organised and equipped that they will be able not only to accompany their cavalry anywhere, but, in addition, to operate and manœuvre as self-contained units. They will thus free the cavalry from the necessity of dismounted action when met by superior numbers, and from being compelled to detach squadrons to secure tactical positions to check the enemy, or strategical points of importance which it may be vital to possess. In addition to this, detached machine guns may be used in the place of mounted escorts to the Horse Artillery, and to enable single troops to be used in the place of

* See Chap. VII., *Cavalry Training*.

contact squadrons without detracting from their offensive or defensive strength.

The Divisional General of Cavalry will have 24 machine guns under the present organisation, viz. two guns with each regiment; and it must be assumed that they have been organised and trained to work together, as suggested in Chapter I, in order to enable them to be used as fire units in co-operation with their brigades or the Division. It will depend upon the nature of the country, the tactical situation and the strength and morale of the opposing cavalry, whether the G.O.C. retains all four batteries in his own hands or gives one or more to the brigade commanders. Every situation requires its own special treatment, and the following is only given as one of many possible methods of using machine guns in the preliminary stages of the cavalry combat. We will assume that a Cavalry Division is acting as Independent Cavalry and is operating against an unknown but superior force of cavalry as yet unlocated, in country such as will be met with in a European campaign.

The formation for the march towards the enemy will of course depend on the roads available and the general nature of the country, but an advanced guard of one brigade would be sent out with orders to push forward tactical reconnoitring patrols supported by larger detachments which may be called contact troops or squadrons. This brigade might be given two batteries of machine guns, while the G.O.C. retained two batteries with the main body, which would probably move as concentratedly as possible in two wings with flank guards, and a battery

of machine guns on each flank. The advanced guard commander would use one battery of machine guns to give each contact squadron a section of two guns and thus enable it to retain its mobility if held up by rifle fire. He would keep one battery intact to use in the manner to be indicated later with his main guard.

We will follow one of these contact squadrons and see how the machine guns may be employed to assist it. In the first place the squadron now possesses the fire power of an extra hundred rifles and can therefore afford to send out stronger patrols and give them more support. The contact squadron, having sent out its patrols and any detachments necessary for special services, will sooner or later be called upon to afford active support to one of its patrols when the latter come in touch with the enemy. Upon the information furnished by this patrol, as to the strength of the enemy and the nature of the country, will depend the action to be taken.

The necessity for brushing aside all opposition and pushing forward will probably cause the commander of the contact squadron to attack with vigour, and such a course will compel the enemy to accept the engagement mounted, or, if inferior in strength or morale, to take up a position for dismounted action and hold the squadron by rifle fire.

In the first case the squadron with scouts in front will move in column of troops ready to wheel into line for the attack. The machine guns should move in line immediately in rear of the rear troop and as close as possible, so as not to be seen from the front. The subsequent

action of the machine guns must of course depend on the method of attack of the squadron and the nature of the country; but the objects in view will be (1) to support the attack by fire up to the moment of the collision, and then to bring fire to bear upon the retreating enemy and prevent their rallying; (2) to take up a position to cover the retirement of the squadron and enable it to re-form if worsted in the encounter. It is likely that if the first object is successfully attained and the fire of the section brought to bear on the enemy's squadron, from any range under 800 yards, for only 30 seconds, the effect on the closed body of horsemen, whether in column or line, would be such as to throw them into considerable confusion at the moment of the charge, while any attempt to charge the guns, even by a second squadron, must be abortive and result in disaster. The squadron leader should have arranged beforehand with his machine-gun commander to manœuvre with a view to this co-operation, and will give the signal a few moments before wheeling into line to attack, when the machine guns will gallop out to the most suitable flank, and come into action as rapidly as possible so as to enfilade the enemy's advance. The moment the charging squadrons mask the fire of the guns, they must remount and gallop to a fresh position in anticipation of the pursuit, in order to bring fire to bear on the retreating enemy and prevent a rally; or to cover the retirement of the squadron and enable it to rally and re-form. The effect of his fire and the success or otherwise of the first collision will enable the section commander to decide

instantly which of these two actions will be necessary. It will be seldom that the country is so flat that some feature cannot be found giving a good field of fire or commanding a road, or bridge, or other defile by which the enemy must retreat, or which they must pass in pursuit, and the use of such features will greatly assist the action of machine guns. Although both guns will fire together before the collision, their subsequent action must be made in mutual support, one gun firing while the other races to a new position from which it can overtake and flank the retiring enemy, so that, if possible, one gun is always firing at effective range while the other is moving. In the same way, if covering the retreat of their own squadron, one gun will fire while the other retires to a second position and in turn covers the retirement of the first. The guns must not hesitate to separate widely in order to obtain unseen the best possible positions from which to fire, but must always be able to support each other. If the country is much broken, opportunities will be found for concealing the gun in a position from which to enflade the pursuing cavalry at short range, or for bringing a cross-fire to bear from both guns on a defile. Such an opportunity, skilfully utilised, when the range has been accurately taken, and fire reserved until the main body is within close range (600 yards or less), should be so decisive in its result as to check the pursuit altogether and possibly turn defeat into victory, if the retiring squadron has had time to re-form and is in a position to launch a counter-attack at this moment.

To make full use of machine guns with a squadron, it is necessary for the squadron leader thoroughly to understand their power and capabilities, and to anticipate their action and the result likely to ensue; otherwise he will be unable to do more than passively accept their support, and will fail to reap the advantage of their principal characteristic—their ability to surprise and their power suddenly to overwhelm with fire a superior body of troops.

Should the enemy's squadron be reinforced or be so superior in numbers that an attack appears inadvisable, it may be possible with the assistance of machine guns to equalise matters by concealing the guns in a donga or behind a ridge, a clump of trees, or group of rocks, and then manœuvring the squadron so as to draw the enemy across the front of the guns at close range. The best method of doing this is to lead the squadron, formed in column of troops, past the cover selected at a sharp pace, the guns being concealed on the outer flank or behind the rear troop as circumstances may require. As the squadron passes the selected spot, the machine guns will be dropped; and the squadron at the same moment wheeling into line towards the enemy, will hide the guns from view until they are concealed by the cover.

The gun horses and the rest of the detachment not actually required to fire the guns should move on with the squadron, so that no indication is given the enemy that the guns are not still with the squadron. If this manœuvre is successfully accomplished, it will not be difficult to draw the enemy across the guns at close range.

It is a manœuvre well worth practice in peace, but an opposing squadron should always be used to try to detect the guns and thus ensure that the concealment is properly carried out.

We will now suppose a case where the enemy takes up a defensive position and the contact squadron has to force its way through. The squadron leader's method of attack must entirely depend on the strength of the position, the force holding it, and the natural features of the country in the immediate vicinity; and on his plan of attack must depend the details of the action of the machine guns. The general principles governing their employment will remain the same, however much they may vary in the method of carrying out: the first is to supplement the rifle fire of the squadron so as to enable as many men as possible to remain mounted, while holding the enemy to his position; and the second is to gain superiority of fire for the squadron at the time and place selected by the squadron leader. We will suppose the position to be strong and the enemy to possess machine guns, and that the squadron leader's plan is to hold the enemy to his position by a vigorous frontal attack, while he turns the weaker flank. To do this he may decide to use his guns for the containing attack supported by a troop, or to use his squadron for the containing attack and his guns to turn the flank. Having machine guns in position against him, it might be advisable to choose the latter course, because machine guns are less effective against a skirmishing line, while his own machine guns are more effective if they can gain

the flank or rear of the enemy's position and thus enfilade them, and any movement of mounted troops to repulse the turning movement, or take their attackers in flank, will afford the machine guns an opportunity for decisive fire action. Should the machine guns or one of them succeed in stalking the led horses of the enemy, their action will probably be decisive, as nothing affords a machine gun such an easy and effective target as the horses of a dismounted squadron, while the effect of fire on them is to render the squadron immobile and to place them out of action as cavalry altogether.

The method of attack will probably be as follows. Scouts (dismounted) having been sent forward to reconnoitre and draw fire to disclose the extent of the position, two troops dismounted and widely extended will advance to the attack and open a heavy fire and push the attack as hotly as possible; at the same moment one troop (mounted) will move slowly round the flank which it is not intended to attack, keeping wide of the position and closed up, and in signalling communication with the squadron leader. This will probably draw attention to this flank, and the troop should report by signal any movement made by the enemy to check them. Rapid fire should now be ordered all along the line, and the troop on the flank should wheel and open out towards the enemy, but not approach within range if it can be avoided. Under cover of this demonstration, the machine guns with the remaining troop will work round the flank selected for attack, the guns being concealed on the outer flank of the troop and using every bit of

cover possible to prevent being seen. Scouts must precede them, and the troop should screen their movements and engage the enemy with fire if opposed. Engagement with the enemy should be avoided as far as possible until the place selected for attack is reached, and the position turned. Even now the machine guns must avoid opening fire with the troop, and must endeavour to find a position from which an enfilading fire can be brought to bear at close range. Under cover of the surprise caused by the sudden burst of machine-gun fire, the second gun must push farther round to the rear, and try to fire on the led horses or catch the enemy's guns on the move, for they will certainly be moved to meet this fresh attack. If the horses cannot be reached, the second gun must seek the best position to bring a reverse fire in support of the first gun ; and unless a really good target is obtained, fire should be reserved until the first gun is discovered and attacked, when its intention to retire must be the signal for a burst of heavy fire, which must be kept up until the first gun is in a fresh position, and ready to open fire to cover the retirement of the second.

This action will enable the squadron leader to use the troop feinting on the other flank, which he will have recalled on the first sign of firing by the flank attack, in order to reinforce the point where the attack can be pressed home.

The machine guns must avoid engaging those of the enemy, while always endeavouring to catch them limbered up, *i.e.* when changing position or while coming into or going out of action, for then they are most vulnerable.

The situation at the moment of the flank attack is this : The front of the position is attacked by a strong but widely extended firing line which overlaps the flanks and compels a strong defensive firing line to check its advance. If the defender decides to put his machine guns into position here and to reserve half the squadron for defence of the flanks, the great extension of the attack renders their fire of little effect as long as the attack utilises cover and advances by rushes from the right or left of sections ; on the other hand, if he decides to put the squadron into the firing line and to use his machine guns to protect his flanks, he has either to divide his guns or wait till he can see which flank is threatened, and he cannot ignore the troop which is moving against one. Consequently, he must either be weaker than the flank attack—in which case it is likely to succeed ; or he must withdraw troops from his position to strengthen the threatened flank—in which case there should be no difficulty in pushing home the front attack with the aid of the extra troop ; while the position of the machine guns on the flank and rear should render his retirement from the position very costly. In all probability the threat of turning a flank either by mounted troops or by machine guns will compel the enemy to abandon the position in the case of a minor engagement between squadrons—especially where a counter-attack is rendered impossible by the strength of the frontal attack.

When touch has been gained by the contact squadrons and the enemy found in force, they will either be compelled by superior numbers to fall back or they must

be at once supported; in either case the advanced guard will now become engaged and will endeavour to break through the advanced guard of the enemy, or, if in touch with the main body of the enemy's cavalry, will endeavour to prevent him breaking through till their own Cavalry Division comes up.

If it is decided to attack, the action will follow much the same lines as that of the contact squadrons, but on a larger scale and with the addition of artillery; and the machine guns will be used in much the same way to support the mounted attack up to the moment of the charge, for which purpose the machine guns working in pairs on the opposite flank to the artillery must be pushed forward to occupy positions from which to bring fire to bear on the hostile squadrons while manœuvring prior to the attack. The whole battery may be used for this purpose if the ground favours their action; or a single section only, while the remainder are held back as a reserve to complete a successful charge or to cover the retirement of the brigade in the event of failure.

The officer commanding the machine-gun battery will remain with the brigadier and must be perfectly acquainted with his plans, and will receive from him direct orders as to the way the guns are to be employed to support the attack. The details for carrying out these orders should be left to the battery commander, who will issue his own instructions to the section commanders, who should also be told the brigadier's plans. The section commanders must be given a free hand in selecting fire positions and in all details relating to coming

into action and opening and ceasing fire—the battery commander's orders only indicating the flank and extent of the positions of observation for each section, the method of action and the object to be attained. Under special circumstances he may order certain specific action such as reservation of fire, simultaneous fire on a given signal, or concentration of fire on a certain target ; but it must be remembered that definite orders of this nature tie the hands of section commanders, and tend to paralyse their action and destroy initiative, and can be justified on rare occasions only. Should the enemy take up a defensive position, the machine guns will be used to economise dismounted men and to bring a sudden and intense fire to bear on the defenders when they attempt to retire from the position. Cavalry will not "assault" a position, but rather try to compel the defender to retire from it by turning a flank and threatening his led horses or his line of retreat, while he is held to his ground by fire. Some guns should also be held in reserve to meet a counter-attack or to be launched in pursuit when the enemy attempts to retire. The machine guns with the contact squadrons will be available, as these squadrons become merged in the main guard, and they must now be used to hold tactical positions of importance and to hinder the march of the main body of the enemy by seizing all rising ground in front or to a flank of the approaching cavalry.

The Division will now have concentrated and joined the advanced guard, and will be manœuvring in anticipation of the cavalry combat. All the machine guns,

except those holding positions in front, will now be concentrated under the Divisional General. They will be used at this stage in conjunction with the artillery—but not in their vicinity—to support the deployment of the Division by their fire, and they must necessarily be concentrated and employed as batteries in order not to hinder the deployment and free manœuvre of their own cavalry. The flank opposite to that of the artillery * will generally be used, and “positions of observation” be maintained where the guns are concealed from view and if possible from artillery fire.

The officer commanding the machine guns of the Division should remain with the G.O.C., and must be perfectly acquainted with his plans and intentions. As a rule fire will not be opened in the first instance except by his order. Officers commanding batteries must be where they can best direct their fire † and at the same time be in signalling communication with their Chief. Ranges will be taken from the “position of observation,” but should the guns have to gallop to a fresh position and fire at once, the opportunity for using combined sights by the battery if the range be unknown and the time limited should not be neglected. Rising ground is very important at this stage, for it enables fire to be maintained until just before the collision.

Should the ground permit of the machine-gun batteries approaching the enemy unseen, and enable them to reserve

* Artillery draws the fire of the enemy's guns and prevents the free action of the machine guns.

† On the left of the battery.

their fire from a concealed position until the closed bodies of the enemy's squadrons come within effective range, the result should be so decisive as to render the attack of the Division successful, even against greatly superior numbers. The machine guns should render the envelopment of a flank by a superior force impossible, and their great mobility will enable them to meet easily any movement of this kind.

They should avoid the enemy's artillery, which alone can put them out of action, but they must boldly engage it within effective ranges should it open fire on the cavalry.

The defeat of the independent cavalry alone will be of little value, and it will be necessary to ensure their complete destruction to enable the exact situation of the enemy's forces to be discovered. A close and relentless pursuit is therefore imperative, and it must be remembered that machine guns with cavalry are far more effective in the pursuit than cavalry alone, because they move with the same speed; but whereas cavalry can only use the sword or lance against others similarly armed and capable of defending themselves, and both men and horses are equally subject to exhaustion, the machine guns on overtaking the enemy are able to shoot down men and horses without any more effort than is needed to set up the guns and work the elevating and traversing gear. The exhaustion of men and horses has no effect upon the accuracy or intensity of the fire, while the result is further to scatter and disperse bodies that may still retain any cohesion.

IN THE PURSUIT

There are many instances in war when cavalry flushed with victory and exhausted in the pursuit have been themselves caught and ridden down by troops that have rallied or by fresh supports; but machine guns have nothing to fear from cavalry, and can confidently await their attack while covering the retirement of their own cavalry. The longer they are in action, the more time there is for their own horses to recover their "wind," and be ready to carry their guns out of action at a speed which renders pursuit useless. It must be remembered also that the machine guns with cavalry cannot be distinguished from that arm at a distance even when moving alone, while it is impossible to do so when they are with their regiment or brigade.

The machine guns must anticipate the pursuit and race off to positions on the flanks and rear from which they can best cut off, and if possible annihilate, the retreating squadrons; no effort must be spared to inflict the maximum loss, and guns must be pushed up to close range even at the risk of being ridden down.

The troops reserved for the pursuit should have their machine guns with them, as their co-operation will be of the greatest service, and regiments will probably act separately, and may be directed to special points to intercept the enemy or prevent reinforcements coming up.

The independent cavalry, having defeated and scattered the enemy's cavalry, are now in a position to send out strategical patrols, and, having "torn aside the veil," are able to see the dispositions of his main armies,

and are free to undertake raids on his communications and to harass and delay the march of his columns.

Raids are only justified when some specific object can be attained, and are only likely to be effective during the course of operations when both armies are in touch and awaiting reinforcements to renew hostilities.

The cavalry will in most cases be more profitably employed in attacking the enemy's main columns in flank or rear, and thus hindering their march by causing premature deployment. This action will bring the independent cavalry in contact with infantry. The machine guns can now be used to supplement the fire action and to enable as many squadrons as possible to remain mounted. They should be employed as batteries or attached to squadrons according to the nature of the engagement and the force to which they are opposed. Usually they will be held back in the preliminary stages of the dismounted fight, until the action has developed sufficiently to enable the general situation to be seen, when they will be sent forward under cover to positions from which they can develop superiority of fire, by concentrating against the enemy's strongest points. This will not prevent the use of a few guns with the advanced guard to seize and hold important points, and nothing should prevent machine guns from seizing an important position the moment it is discovered.

The four batteries of machine guns of the Division may be allotted as follows: With the advanced guard, one battery; with the main body (for use in firing line), two batteries; with the G.O.C. (in reserve), one battery.

TO COVER RETIREMENT

This reserve battery will enable the G.O.C. not only to reinforce a particular point or cover the retirement with a rapidity and effectiveness that no other form of reserve could do, but to use it to turn a flank or to meet a counter-attack without exposing his squadrons to fire during the movement. The security they are able to afford to the horses of the squadrons in the firing line will justify their occupying "positions of observation" on the rear flanks, from which they can afford protection while waiting other employment. The deployment of the enemy's infantry and the development of his fire will compel the cavalry commanders to break off the engagement; and to do this without loss under the heavy rifle fire to which they will now be subjected, this fire must be temporarily checked or rendered ineffective. Every machine gun will therefore be brought up to such positions as will enable them to sweep the enemy's firing lines, and under a simultaneous fire from the 24 guns the dismounted men will be able to retire from the firing line and regain their horses. The retirement of the machine guns must be effected in the usual way, each section acting independently and retiring by alternate guns—no gun moving till the other is ready in a fresh position to open fire. The sections on the flanks should usually retire first, as they are better able to protect the centre by a cross-fire.

COVER IN FIRING LINE

When the country is flat or the features devoid of natural cover, it will be necessary to provide pits for the

machine guns practically in the firing line. If this is carried out with skill, the guns may be perfectly concealed, and protected even from artillery fire. These pits should be made along the whole front and as widely scattered as possible, and when a gun is discovered by the artillery it should immediately be lowered into the pit, out of sight, where it will be perfectly safe, until the artillery directs its fire elsewhere. The following instance from the Russo-Japanese War is an illustration of the skilful handling of machine guns under such conditions.

EXAMPLE FROM RUSSO-JAPANESE WAR

On June 8th, 1905, at Wan-ching, General Samsonov had two cavalry regiments and a machine-gun section of four guns. During the dismounted action these machine guns were concealed in the firing line, two in the centre 100 yards apart, and one on each flank about 400 yards away. When the firing line retired, the machine guns opened fire and held the position alone; and so well had they been posted that, although attacked by infantry, which advanced to within 300 yards of the position, supported by artillery which brought a heavy fire to bear on the front occupied by the machine guns, they were able to hold their ground for nearly three hours, when the Japanese abandoned the attack and fell back. It would be interesting to know if this astonishing success of machine guns, enabling the cavalry to defeat infantry supported by artillery in a fight of several hours' duration, without risking their personnel or abandoning their

mobility, was due to the use of natural cover or, as seems more probable, to the use of pits which would have afforded protection from artillery fire as well as concealment.

IN THE BATTLE

The hostile columns having arrived within striking distance, the battle will now take place, during which the larger masses of cavalry will usually occupy a position on the flank of the main line of battle. From here they will be able to co-operate by attacking on the flank, from which they can bring fire to bear concentrically with the main attack, while such a position favours pursuit on parallel lines, and is also a suitable one from which to prevent pursuit in the event of a retreat. The machine guns will now assemble in batteries under their G.O.C., who will use them, as the occasion may demand, to occupy "positions of observation," to protect his front and flank in the early stages of the battle, and later, in conjunction with a few dismounted squadrons, to envelop the enemy's flank and bring a powerful volume of fire to assist the main infantry attack, or to draw troops away from the point selected for assault.

"The climax of the infantry attack is the assault which is made possible by superiority of fire," * and the cavalry commander will be justified in using his 24 machine guns in assisting to attain this object, provided that in doing so they remain under his immediate orders and in a

* *Field Service Regulations, Part I.*

position from which they are instantly available for the pursuit.

We have already seen how machine guns should co-operate in the pursuit, and their mobility will render them even more effective when pursuing infantry. The following example from the Russo-Japanese War may be of interest in this connection.

EXAMPLE OF MACHINE GUNS USED IN PURSUIT

A Russian infantry battalion which was retreating by a pontoon bridge across the Taitzu River was almost annihilated by a Japanese cavalry regiment, accompanied by machine guns, which swept the bridge; "and for the first time in this war," adds the *Standard* correspondent with Kuroki's army, "a machine gun was used with decisive effect."

CHAPTER IV

EMPLOYMENT IN THE FIELD WITH PROTECTIVE MOUNTED TROOPS

AN army may be covered either by a general advanced guard, usually composed of all arms and including either the whole or part of the Protective Mounted Troops, or by a body of Protective Mounted Troops, operating in front of the tactical advanced guards of the various columns, or by both.* As large a portion as possible of the Protective Mounted Troops should be kept concentrated.

It is probable that the side which is weak in cavalry will dispense with Independent Cavalry altogether, and will meet the Independent Cavalry of the enemy with their Protective Mounted Troops supported by machine guns. The Japanese, who were outnumbered by six to one, were unable to use Independent Cavalry, and during the early stages of the war supported their cavalry by infantry. The Russians, who possessed masses of cavalry, used them principally as Protective Mounted Troops, if we except the raids made by the Division under Lieutenant-General Mishchenko after the fall of Port Arthur. The Protective Mounted Troops will therefore, in such a case, not only have to prevent the enemy's Independent

* *Cavalry Training*, 1912.

Cavalry from obtaining information by penetrating their screen, but will also have the task of obtaining information as to the enemy's numbers and direction of march. That they are able to do this even in the face of greatly superior numbers has been proved by the Japanese, whose cavalry, outnumbered and badly horsed as they were, succeeded throughout the war in a remarkable degree in penetrating the enemy's screen and obtaining information. The Russians, on the other hand, in spite of their masses of cavalry, failed not only to destroy the diminutive force opposed to them, but even to penetrate their thin veil or obtain any information of what was taking place behind it.

Are we not in precisely the same position as the Japanese in our numerical weakness in cavalry, and should we not be confronted by the same problem in the event of war with a military nation?

Let us, then, see how the Japanese Protective Mounted Troops were able to fulfil their mission in spite of the vastly superior numbers of their opponents. In the first place, the Japanese cavalry is trained in the orthodox cavalry spirit, which is highly developed; suppleness and power to manœuvre for the delivery of the attack is the chief aim, while the charge is regarded as the culmination of manœuvre. Swordsmanship, horsemanship, and independent scouting are the features of individual training, while only thirty rounds per annum are fired in the musketry course, from the carbine with which they are armed in addition to the sword. The consequence is that the whole cavalry is saturated with a spirit of enterprise

and daring, and a firm belief in its superiority to all other arms in manœuvre and offence. It was this spirit and confidence that enabled them, when outnumbered and deprived of their swordsmanship, to retain their dash and mobility, while using their carbines from behind village walls against the hosts they were unable to ride down. It must be remembered that the Japanese had practically no machine guns at the beginning of the war, and those hastily purchased after hostilities broke out were required at Port Arthur. Consequently, the Japanese had to solve the problem of how to oppose the masses of Russian cavalry with their few but highly trained squadrons, and their solution was to hold up the Russian cavalry by fire on every possible occasion, and to be held up by them as seldom as possible. For this purpose they were closely supported by infantry ; and it is of interest to remember how our own light infantry were used in much the same way in the Peninsula—the 13th Light Infantry being actually mounted for the purpose. Can we ignore the lesson ? Is it not plain that machine guns would not only have done the work of the carbine and rifle far more effectively, but, instead of depriving the cavalry of much of their mobility and preventing them from being made full use of—as undoubtedly was the case—they would have enabled them to go anywhere with the certainty of being able to defend themselves against a greatly superior force of cavalry.

The action of Protective Mounted Troops on a large scale is so similar to that of Independent Cavalry—especially in the matter of patrols and contact squadrons—

that it will be unnecessary to reconsider these duties. In speaking of the duties of the Protective Mounted Troops, *Field Service Regulations*, 1909, Part I., Reprint 1914, Chapter V., observes: "These functions of the Protective Cavalry will entail principally defensive action, and will necessitate extension over a considerable front; but the commander must dispose his force in sufficient depth to enable it, with the assistance of the advanced guards of the columns in rear, to check any attempt to break through and surprise the main body."

Machine guns, however, will provide the necessary fire power without requiring many men or horses, and the use of a few extra batteries of machine guns with the Protective Mounted Troops would give them all the stiffening and defensive power of infantry without detracting from their mobility as cavalry. If the Japanese have taught us anything, it is this—that our cavalry, small as it is, if properly supported by strong and well-trained batteries of mobile machine guns, will be able to more than hold its own against greatly superior numbers in a European campaign. To attain such an end we should at once organise cavalry machine-gun batteries, and attach two batteries to each brigade in addition to the guns they already possess. This would give each cavalry brigade the fire power of a battalion of infantry (900 rifles), while in no way detracting from their mobility, as they would only occupy the road space of two extra squadrons, and move just as rapidly over any country. The alternative is to follow Colonel Zaleski's advice and attach two machine guns to each squadron, which would

give the same number of guns, but would be likely to detract from the efficiency of both guns and squadrons. We are, however, dealing with existing organisation, and, however much we may desire to increase the efficiency of our Protective Mounted Troops, we have only one battery of six guns with each brigade instead of the visionary three. Let us see how we may use them to the best advantage.

Supposing the Protective Mounted Troops to consist of one brigade, they will probably be extended to form a screen over a considerable front. The exact formation and method of advance will entirely depend upon the proximity of the enemy, his strength, and the nature of the country. We will suppose the country open and both flanks exposed and the enemy in the immediate vicinity, the contact squadrons or patrols having gained touch with him. The duties of the Protective Mounted Troops are the tactical reconnaissance, and the occupation of positions of tactical importance to the infantry and artillery.

With so small a number of machine guns as a single battery, it will be necessary to decide where they may be most usefully employed, and a great deal must depend on the particular situation. If the tactical reconnaissance is incomplete, they may be used in the first instance to hold the enemy in front while the squadrons move round the flanks to complete the information required. If used in this manner, they must be handled with dash, and, working in widely extended pairs—two in the centre and two on each flank—must push forward and try to surprise the enemy in close formation, moving from

position to position and never remaining stationary after fire has been opened, provided cover exists to hide movement. Six guns co-operating in a vigorous offensive, unopposed by artillery, can push up to close range and do immense damage, while the enemy should be quite unable to decide what numbers are opposed to him. A ridge, a gully, a road with good hedges parallel to the front, is sufficient to conceal the movement of machine guns; and, as they have nothing to fear from cavalry and can always retire if galled by rifle fire, they can dominate the situation if handled according to the principles already laid down for them.

Where the tactical reconnaissance has already been completed and the principal object is to protect the force covered, machine guns will be found most valuable to support the flanks should an attempt be made to turn them, as their mobility enables them to be sent to a distant point with great rapidity, and their concentrated fire at once makes itself felt at a threatened point and turns the scale in a fire fight with astonishing suddenness. This mobility renders them particularly suitable for seizing and holding positions until the main body comes up.

When used for this duty the battery or section commander, as the case may be, should receive definite orders as to the importance of the position he is sent to hold and how long he is expected to remain there. The position should be carefully reconnoitred by scouts before the guns approach it, and steps should be taken at once to entrench the guns and teams against artillery fire if the position is to be held for any time. Alternative

positions for each gun, with concealed approaches, should be constructed, and the guns carefully hidden by erecting screens in front of them, or by placing them behind bushes, which are then cut almost through the stem, so that they can be instantly removed to open fire. Ranges must be taken and carefully written down, with their compass bearings to conspicuous marks. The flanks must be protected, and dead ground made good by posting one gun to sweep it. The gun horses and detachment not on duty should be posted well to the flank and rear, where they can obtain the best shelter from view and fire. Signalling communication should be established with the rear and flanks when possible.

Very definite instructions must be given as to when and on what targets fire is to be opened, and the temptation to fire at patrols or small bodies of the enemy must be resisted. Fire should only be opened in the first instance by the order of the senior officer present, and in all cases should be reserved as long as possible.

The battery of machine guns may also be used during the cavalry combat as already described in the last chapter, and when used as a reserve on a flank, should take up "positions of observation" if the ground permits, from which they can repulse a flank attack, while remaining ready to move off at a moment's notice to any point where they may be required.

Machine-gun commanders with the Protective Mounted Troops must bear in mind that their object must always be to help their cavalry in attaining the end in view, be it reconnaissance, attack, or resistance, and

that close co-operation with the cavalry commander is essential. The most brilliant action causing loss or defeat to a portion of the enemy is useless if it does not directly further the object of the Protective Mounted Troops; and if we are unable to give here many examples from recent campaigns, it is principally due to this want of co-operation and consequent inability to make effective use of the machine guns.

The report made by Captain Golochtchanov, who commanded a detachment of six machine guns attached to the 11th Orenburg Cossacks during the last few months of the war, contains a vivid description of the reconnaissance of the Japanese position made on August 14th, 1905, at Sitasi, by the regiment forming the advanced guard of Major-General Grêkow. "At about 4 a.m. the Russian cavalry attacked the Japanese outposts, consisting of three companies of infantry and two squadrons. While waiting for the situation to be cleared up, the machine guns were kept in reserve. Two and then four were sent against the enemy's flank; the Japanese retired from position to position. At one o'clock the fight stopped; the Russians had carried three villages and determined the line and direction of the enemy's trenches. Their task was accomplished. On the Russian side there were only 100 rifles in the firing line, with four machine guns." *

"Protective Mounted Troops will generally move in bounds from one favourable position to another, such as a ridge or river-line, to the next."

* *France Militaire*, April 15th, 1905.

"The intervals between such positions should be passed as rapidly as possible, and at each a halt should be made whilst the next move forward is reconnoitred and arranged." *

When this method of advance is used the machine guns working as independent sections should be used to hold important features, such as bridge-heads, defiles, passes, and villages in the positions held. If positions are carefully selected whence effective fire can be brought to bear on points which the enemy must pass in close order, and the usual procedure as to cover, concealment, and range-taking is observed, the mounted troops may be spared much fatigue and given opportunities for resting men and horses.

USE OF MACHINE GUNS IN A RETREAT

During the battle the Protective Mounted Troops will be used in the way already described in the previous chapter, in which we also dealt with the Pursuit; we will therefore now see how they may be used to assist a Retreat.

"When retreat appears inevitable the routes to the rallying position should be communicated confidentially to commanders. The rallying position should never be so close to the battlefield as to come at once under the fire of the enemy." It should be occupied as soon as possible by some portion of the artillery, and by complete infantry units. *The cavalry and other mounted troops,*

* *Cavalry Training*, 1912, pp. 237 and 272.

aided by a strong force of artillery, will meanwhile check the enemy's advance, and the remainder of the force, with the exception, if possible, of a rear guard in support of the mounted troops, will move as rapidly as possible to the shelter of the rallying position and there reorganise. Steps should be taken immediately to secure any bridges, defiles, or other vital points on the line of retreat, at which the enemy's mounted troops might intercept the force. Commanders of retreating troops must recognise that their greatest danger will arise from attacks in flank delivered by the enemy's mounted troops and horse artillery; if possible, therefore, they should take precautions that *all ground commanding their line of retreat is occupied by flank guards.*" * The action of the Protective Mounted Troops is indicated in the first paragraph quoted in italics, while the second gives the only method by which a retreat can be rendered successful or secure. In no phase of modern war are machine guns so valuable as during a retreat, and it is quite probable that, properly organised and handled, they may make the pursuit so difficult and costly as to render the retreat a far less dangerous undertaking than it has been in the past. It is not difficult to realise that an arm possessing such great mobility, together with rapidity and concentration of fire, before which no closed bodies can exist at effective range, will be able not merely to check and delay pursuing cavalry, but may even prevent any effective pursuit by mounted men alone.

The lack of machine guns on the side of the Russians

* *Field Service Regulations*, Part I. Reprint 1914, chap. vii. p. 195.

in the late war renders this point still to be proved by a future campaign ; but it is well known that the machine guns with the 1st Siberian Army Corps constantly checked the Japanese pursuit, and more than once rendered a flanking movement abortive.

The moment that it is evident that a retreat is necessary it will be the duty of the Protective Mounted Troops commander immediately to collect all his cavalry, with a view to checking the enemy's advance, and at the same time he should apply to the G.O.C. for as many machine guns as he can spare, and this is certainly the occasion when all the mounted machine-gun batteries should be sent to the commander of the rear-guard.

The first step will be to allot one or more batteries to the troops forming the two flank guards and to the main guard covering the centre. The general situation at this moment will of course govern their use. "The commander will determine, in accordance with the features of the ground, whether delay is best brought about by the occupation of positions blocking or flanking the enemy's line of advance and the employment of fire action, or by a vigorous and timely attack by a body of horsemen. Frequently, however, opportunities may be offered for acting wide on the flanks, where even the threat of a mounted attack or a sudden dash from ambush may cause the enemy's pursuit to be delayed without the force becoming too deeply committed." * In either case the important thing for machine guns to do at this stage is quickly to seize ground from which to bring

* *Cavalry Training*, 1912, chap vii. p. 243.

effective fire to bear across a wide extent of front. Dealing first with the commander of the batteries allotted to the centre, he will consult the O.C. Cavalry and arrange with him his plan of action. It is of the first importance to stop the forward movement of the enemy on the direct line of retreat, as this is the easiest line of pursuit and the one upon which the most shaken portion of the troops will be found. The probable course of action for the machine guns here will be to break up into sections and form a line along the nearest feature of ground immediately in rear, from which fire can be brought to sweep the front and check direct pursuit. The more broken the country and the more commanding the ridge or other features, the more effectual will be the check, for at this stage guns will certainly be prominent in the pursuit and shelter from their fire will be very necessary.

The fact that the machine guns are working in pairs on a very wide front should make it exceedingly difficult for artillery to locate them, except singly, and thus it will take them a considerable time to silence more than one or two of the scattered line of guns. Alternative positions and the constant change to a fresh one after opening fire will render the majority of the machine guns capable of remaining in action until closely engaged by the infantry. This will cause considerable delay, and by the time a serious infantry attack develops the machine guns will be able to retire to a fresh position. In anticipation of this, the battery commanders will have sent scouts to the rear directly the guns are in position, and they should personally examine the new line to be taken

up, and select the gun positions for each section. One scout should remain in the new position of each section and the other return to the gun horses of his section, to guide them when the moment for retiring takes place.

The gun horses should be as near the guns in action as possible; but should the position be such that this is impossible without exposing the horses to fire, then all the spare rifles of the gun-team must be used to open rapid fire to conceal the fact that the gun is being moved. The guns of each section must arrange with each other to cover their own retirement, but the battery commander must issue the order in the first instance and will arrange which sections move first.

Where the pressure is great and co-operation difficult, it may be advisable to retire by half-sections along the whole front at the same moment; thus the right guns of sections may be ordered to retire on a given signal, while the left guns cover them by a heavy continuous fire. If this method of retirement is adopted, it will be necessary for the second position to be within long range of the first, which is not always advisable in covering a retreat. It will seldom be possible to select a concealed position in the early stages of the retreat, but it must be borne in mind that if a concealed position can be occupied, and fire reserved until the pursuing cavalry are at close range, the effect of such a surprise will do much to check the pursuit, and impose such caution on the enemy that they will hesitate to press on without those precautions which necessitate deployments and thus cause much delay.

The machine guns allotted to the flanks should form the supports to the cavalry there ; and if two batteries are available on each flank, one should accompany the cavalry to enable it to remain mounted, while they provide the fire action necessary to support it in the attack and to cover its retirement in the face of superior numbers. The detail of such action has already been given with the Independent Cavalry. The other batteries will break up into sections and move parallel to the line of retreat in single file at wide intervals, keeping touch with the cavalry by scouts on the outer flank. The object of this battery is to seize and hold good positions on the flank of the line of retreat until the main body has passed. The scouts of the rear section of this battery should get into touch with the scouts of the flank gun of the centre battery from time to time, to ensure proper co-operation between the various batteries.

The importance of concealed positions from which to ambush the pursuers must not blind machine-gun commanders to the necessity for seizing and holding to the last possible moment, even at the risk of capture, every position from which the retreat can be effectually covered and the pursuit delayed. Should a river or other natural obstacle be encountered on the line of retreat, machine guns must freely sacrifice themselves in covering the retirement of the cavalry across the bridge or beyond the obstacle.

Cavalry is the most costly of all arms, and cannot be replaced during a campaign ; machine guns are the least expensive in proportion to their fire value, and the easiest

to renew; they must consequently save the cavalry when they can, even if they sacrifice themselves in doing so.

ESCORT TO ARTILLERY *

There is one important duty which machine guns are able to perform better than any other arm, and that is escorting artillery, but more especially horse artillery. When cavalry are detailed for this purpose they not only deprive squadrons of much-needed men, but can only provide three rifles in action to every four men of the escort, owing to the necessity of providing horse-holders. In addition to this drawback, the horses provide a costly fire-trap for the shells of the enemy's guns which may go wide of the battery. For these reasons, where it is possible to spare them, a section of machine guns should be allotted to each battery of artillery when an escort is necessary.

They should march in the rear of the battery when on a road, and on the outer flank when in open country and away from cavalry. The sole object of the machine guns is to afford protection to the battery from cavalry, and to prevent rifle fire from being brought to bear on them from effective range; therefore the section commander must devote his whole attention to this object, and he is not justified in opening fire on any target that does not directly threaten the battery—this especially applies to that stage of the mounted combat immediately before the collision, when the guns are firing on the opposing squadrons.

* Machine-guns should never be detailed as escort to artillery if they are likely to be of service with their own units.—AUTHOR.

The section commander will be under the immediate orders of the battery commander, and should be acquainted with his plans and intentions. He should remain with him until the position for action has been selected, when he will immediately seek the best position from which to cover the guns, taking particular care not to mask or limit their radius of fire nor hinder their line of advance or retreat. This will necessitate a careful but rapid survey of the ground in the vicinity of the position, in which good ground scouts, who have been previously trained in this work, will materially assist. The most suitable positions will usually be found well to the front and on the inner flank of the battery from 200 to 600 yards' distance. It may be occasionally possible to place a machine gun on each flank from which a cross fire can be brought to bear on ground in front of the guns ; but such a position on either side of the battery, unless the ground is particularly favourable, has the disadvantage of rendering fire control difficult, and may hamper the fire or movement of the battery. The principal considerations which should govern the choice of a position are as follows :

- (1) Good field of fire to protect the battery from attack.
- (2) Position clear of the fire and movement of the battery.
- (3) Immunity from artillery firing on the battery.
- (4) Concealment.
- (5) Cover from fire.

There should be no dead ground in front or on the flanks of the battery, and with two machine guns this

condition can generally be satisfied. In cases where one flank remains exposed and cannot be protected by the fire of the machine guns, or where a portion of the front or one flank cannot be seen, scouts must be placed well out in this direction, where they can see anything approaching and signal timely warning of it, and a position must be selected beforehand to which to move a machine gun should the warning be given. It has already been pointed out in a previous chapter, and may be repeated here, that machine guns have nothing to fear from cavalry under any circumstances, and when in a selected position with ranges accurately known, as they would be in this case, a single gun properly handled could easily stop a squadron. When selecting the place for the led horses, it must be remembered that fire from the enemy's guns is likely to search the reverse slopes of the position immediately in rear of the battery.

The machine guns must not be re-horsed until after the battery has limbered up and moved off, as they are then most vulnerable. They should endeavour to come into action before the battery unlimbers—though this will seldom be possible with horse artillery.

CHAPTER V

EMPLOYMENT IN THE FIELD WITH INFANTRY

THE employment of machine guns with infantry seems at first sight to be obvious, for they fire the same ammunition and have the same range and kinetic effect. Nevertheless, the first machine gun was used by the French in 1870 as artillery, and its name "mitrailleuse" indicates "grape shot" rather than rifle-bullets. This initial error in its tactical employment, together with its crude mechanism, artillery carriage, and short range (about 500 yards), enabled the artillery to silence it early in the battle, so that it rarely proved of any use.

On the few occasions when it was concealed from the artillery and used at short range against the infantry its effect was as astonishing as it was decisive. At Gravelotte several batteries of mitrailleuses concealed near St. Hubert's Farm reserved their fire until the attacking infantry was on the glacis within close range. The result was decisive, and the German attack was repulsed with terrific loss. Again, at Mars la Tour, the German official account describes the repulse of the 38th Prussian Brigade by mitrailleuse batteries placed on the crest of the hill, as causing them such losses as to amount almost to

annihilation. The brigade lost more than half its numbers and two-thirds of its officers.

When it is remembered that this mitrailleuse was not automatic, but had to be operated by hand, that it had 25 barrels and a maximum effective range of only 500 yards, and that it cheerfully engaged in the artillery duel at ranges between 2,000 and 4,000 yards, the only wonder is that, having accomplished so much, the reasons for its failure were not immediately apparent, and that it has taken nearly forty years to convince the world that tactics are as necessary for the effective employment of machine guns as for infantry. The general principles for their tactical employment have already been dealt with in Chapter II., but they are so excellently condensed in Sect. 187 of the German Regulations, that at the risk of repetition they may be quoted here.

“Machine guns enable commanders to develop at fixed points the maximum volume of infantry fire on the smallest possible front. Machine guns can be employed over any country that is practical for infantry, and when they are unlimbered they must be able to surmount considerable obstacles. In action they offer no greater target than riflemen fighting under like conditions, and they can, in proportion to their fire value, support far greater losses than infantry. They can utilise all cover that infantry are able to use. Cover which is barely sufficient for a section of infantry (60 men) can protect an entire machine-gun detachment (six guns).”

In order to see in more detail how machine guns should be employed with infantry and the limitations of their

tactics, it will be necessary to follow the sequence of the infantry combat in attack and defence, and to assume such situations as seem likely to arise.

ADVANCED GUARDS

The action of the infantry of an advanced guard will follow the same lines whatever the dimensions of the force, and the battalion is a convenient unit with which to deal. There are four battalions in a brigade, and three brigades in a Division; consequently the Divisional General will have six batteries of four guns each,* or 24 machine guns, under his command. We will assume that the battalion we are dealing with forms the advanced guard of its brigade, and that the brigadier has given it a battery of four machine guns, two of which will probably belong to the battalion.

Field Service Regulations, 1909, Reprint 1914, page 97, says: "An advanced guard is divided into a vanguard and a main guard. . . . The special duty of the vanguard is reconnaissance. It will therefore generally be composed of the advanced guard mounted troops, with or without a body of infantry as a support. By day, when the country is open and the advanced guard is strong in mounted troops, infantry will not as a rule form part of the vanguard. . . . The main guard comprises the troops of the advanced guard not allotted to the vanguard."

We will first take the case of infantry with the vanguard as a support to the mounted troops, and suppose that a

* Or three batteries of eight guns each, whichever appears to be the more serviceable unit.

company is allotted for this duty and has been given a section of machine guns. The formation of the infantry of the vanguard will largely depend on the nature of the country and the proximity of the enemy. Where the country is open plain they will probably be extended in a long line of skirmishers, in which case the machine guns should march close in rear of the centre on the road. Should the country be close or broken, the vanguard infantry may be confined to the road—with small parties pushed out to the front and flanks—in which case the machine guns should march in rear of the advanced party, and not in rear of the vanguard. It must be remembered that machine guns are able to come into action and open a heavy and accurate fire in less time than it would take infantry of equal fire power to deploy and to open fire from a position; it is therefore the machine guns of the vanguard that should be the first to open fire and give the infantry time to deploy and find fire positions. When the enemy is encountered the object of the vanguard infantry must be to support the cavalry as quickly as possible, and enable them to mount and push forward round the flanks.

The section commander must go forward at once with scouts from each gun, and quickly grasp the situation, consulting the officer commanding the troops engaged as to the action to be taken; he must then select the positions for his guns to come into action. The scouts should take ranges and have everything ready for the guns to open fire on arrival. The moment the guns open fire, the section commander should send scouts off to

find alternative positions to the front and flank from which it may appear possible to enfilade the enemy. Should the target be unsuitable, *e.g.* a line of well-concealed skirmishers, etc., fire must be *reserved*, and the guns should take up positions of observation while the section commander and scouts seek for a position on the flanks from which to bring an effective fire.

As soon as the vanguard infantry are deployed the section commander must co-operate with them entirely, and must take his instructions from the vanguard commander, who should leave him a free hand, merely telling him his intentions and how the guns may best assist him.

When the main guard comes up, in the case where the vanguard is checked, the section commander should take the earliest opportunity of placing himself under the battery commander, and at this stage the guns should be used to seize and hold positions of importance, especially artillery positions. If the advanced-guard action discloses the fact that the main body of the enemy has been encountered, and the G.O.C. decides to engage, the advanced guard will be required to seize all positions of tactical value and to hold off the enemy until the main body has had time to arrive and deploy. Their action will vary according to whether the G.O.C. decides to act on the offensive or defensive. The latest German Regulations say: "On becoming engaged, that side will have the advantage which gains the start over its opponents in readiness for action, and thus reaps the benefit of the initiative." No arm is better able to assist

in this than the machine gun, and every available battery should be brought up at this stage to take part in the advanced-guard engagement.

The Germans say: "The advanced guard will fight on a wider front than that ordinarily allotted to a force of its size, so as to seriously engage the enemy. It will be disposed in groups more or less detached, which will occupy those positions the possession of which will most protect the deployment of the main body. *It will be assisted by detachments of machine guns, which will be placed for preference on those positions which it is most necessary to prevent the enemy from capturing.*" *

The commander of the machine guns of the advanced guard is under the immediate orders of the O.C. advanced guard, and must co-operate with him throughout the engagement. All officers with machine guns must remember that isolated action is useless, and that however effective their fire may be locally, unless it directly furthers the object of the action it is an unjustifiable waste of fire power.

The seizure of ground likely to be of use to the main body—particularly artillery positions—must be the first consideration of machine guns with the advanced-guard infantry, once the infantry are in action. That they can hold these unsupported is certain. "There never has been and cannot be such a thing as a successful attack on a line of machine guns in a favourable position in action, until the machine guns have been well battered by artillery fire," says Lieutenant Parker in his book

* Captain F. Culmann in *R.U.S.I. Journal*, August, 1909.

“Tactical Organisation and Uses of Machine Guns in the Field.”

In the cases where the infantry of the advanced guard forms the main guard, the battery of machine guns should march with the foremost body of troops and should never march in rear, where they are useless, and where, if on a road, they can only be moved up with difficulty. The battery commander should remain with the O.C. advanced guard until he is fully acquainted with the situation and his intentions. Should the situation be such as to enable the advanced guard to brush aside the opposition, the machine guns must be used vigorously to support the infantry attack, and should be pushed forward to seize positions before the infantry deploy, and cover their deployment by fire. In the preliminary stages these positions will probably be on the immediate front, and the four guns should be able to occupy a front roughly coinciding with the first deployment of the infantry. As soon as the infantry come into action the machine guns may be withdrawn and used on the flanks to bring a cross-fire to bear, and to fire on any closed bodies, led horses, etc., that may offer a target. At this stage the guns should work in pairs in mutual support, and may be used on one or both flanks as the situation requires.

Machine guns should rarely be used in the firing line after the infantry deploy, as they offer a rather marked target and can be far more profitably employed in pressing the attack on the flanks.

There are several instances of the successful use of machine guns with the advanced guard in South Africa

in 1900 to support the mounted vanguard, and on many occasions they were able to brush the enemy aside without deploying the main guard or delaying the march of the column.

THE ATTACK

Under cover of the advanced-guard action and the subsequent artillery duel the infantry will deploy for the attack. The first advance of the infantry will probably be covered and supported by the artillery, and they will generally be able to push forward to within long range of the enemy's infantry, without the necessity of covering their advance by rifle fire. From here, however, the firing line will begin to suffer from rifle fire, and it will be necessary to reply to this fire in order to cover the further advance.

The object of this fire will be to bring such a superiority of fire to bear on the enemy as to make the advance to close quarters possible. To assist in this "when the ground permits it is generally necessary to detail special detachments of infantry to provide covering fire for the leading troops. These detachments will usually be detailed from local reserves in the original distribution for the attack, but any commander at any stage of the fight may detail troops from those under his command to assist his advance." *

No one who has controlled the covering fire of infantry, even on manœuvres, will dispute the immense difficulty of timing the opening and ceasing of such a fire, with even

* *Infantry Training*, 1914, p. 135.

a couple of platoons, to coincide with the advance of the troops covered; while the necessity for observation of fire and its concentration on certain parts of the enemy's position make it still more difficult effectively to cover the advance of troops with rifle fire at long range.

That machine guns will be able to perform this duty far more effectively and easily than infantry is manifest from the nature of the fire required, the features being *intensity, control, and concentration*, all of which are characteristic of machine guns. When required to cover the advance of infantry, machine guns should be used in batteries and must be so placed that they are able to see the infantry they are covering, and to sweep those portions of the enemy's position from which fire can be brought to bear on the advancing troops. If the enemy's artillery is not silenced or at least dominated by that of the attackers, it will be necessary to conceal the machine guns from view and provide cover from fire. That machine guns well concealed and provided with cover (pits) are able to remain in action under artillery fire for considerable periods is proved by instances in the Russo-Japanese War (see Chapter III. p. 79). Major Kuhn, who was with the Japanese Army in Manchuria, in his report states: "Importance is laid on concealing the guns, and it was claimed that none had been knocked out by the Russian artillery." Covering fire from the flanks is more likely to be effective than frontal fire, because it will enfilade entrenchments, reach men behind natural cover, and have a more disconcerting moral effect than frontal fire. It will not always be possible to find

suitable fire positions on the flanks for machine guns at this stage of the attack, and it will then be necessary to place them in rear of the attacking infantry and fire over their heads. This can be done with perfect safety—indeed, there is far less danger of accidentally hitting the attacking infantry with machine guns than with artillery fire. Direct fire should only be used when it is impossible to use indirect fire on account of the nature of the ground in the vicinity.

Indirect fire from the reverse slope of a hill has the advantage of concealing the guns and rendering them immune from artillery fire. The position must be carefully selected with due regard to the slope in its relation to fire from the enemy. The best position is just below the crest of a steep slope, as observation of fire is rendered easier and the effect of shrapnel minimised. The safety of the infantry in front will depend entirely on the range, height of the guns above the infantry, and the position of the target (enemy). On level ground the range must not be less than 800 yards,* and the infantry will be perfectly safe at all distances between 200 yards from the guns and 200 yards from the enemy. The methods of employing indirect fire have been given at the end of Chapter II., and its success will depend largely upon the careful observation of fire by the section commanders, who must concentrate their attention on this alone—the battery commander giving the signal for opening and ceasing fire, and the target or direction of fire for each section. Machine guns used as covering fire have

* The Austrian regulations say 1,000 yards.

ample time for preparation ; and as ranges can be accurately taken, and great deliberation used in selecting positions, observing fire, and correcting errors, the maximum of accuracy should be attained. If the enemy is entrenched against frontal fire, good results may be expected from accurate distant fire, owing to the angle of descent of the bullet causing the low parapet or shallow trench to be no protection.

They were successfully used by the Japanese as covering fire for infantry in the attack, as the following examples will show : " At Mukden on March 1st all the machine guns of a whole Japanese division (12 to 18 guns) were brought into action upon a Russian *point d'appui*. The Russian fire was silenced, but burst out again whenever the machine-gun fire slackened. The Japanese infantry used these pauses in the enemy's fire to press forward to close range *under cover of their machine-gun fire*." * On March 2nd the three machine guns of the 10th Japanese Infantry Regiment acted in the same way against a Russian field-work. This method of employing machine guns requires the closest co-operation with the infantry from the commencement of the attack.

Again, during the Japanese attack on Namako Yama the infantry were greatly assisted by covering fire from their machine guns directed on the Russian trenches. These guns were used from behind *screens*, and their success was largely due to their being well concealed.

It will rarely be advisable for machine guns to follow infantry into the firing line, where they present a con-

* Captain von Beckmann.

spicuous target which attracts fire and renders their withdrawal difficult.

We made this mistake in the South African War more than once. At Rietfontein the machine-gun detachment of the Gloucester Regiment, which had followed the battalion into the firing line, was almost annihilated. At Modder River the Scots Guards Maxim gun accompanied the firing line, and the detachment was annihilated by pom-pom fire, and the gun was left on the field alone all day.* In the attack on Cronje's laager at Paardeberg, machine guns were used in the firing line on the left bank of the river, and when the attack failed the machine guns, having suffered severe losses, could not be withdrawn and had to be abandoned till nightfall.

When the covering fire of machine guns is no longer considered necessary, they should be withdrawn and concentrated in batteries in rear of the reserve or in such other convenient position as the G.O.C. may direct. They should take this opportunity of refilling belts, replenishing ammunition, water, etc., and, if the guns have fired many thousand rounds, of exchanging barrels.† They are now at the immediate disposal of the G.O.C. and will be used by him as a mobile reserve. Circumstances vary so in war that it is impossible to particularise in their use at this stage, but their great mobility will render them extremely valuable in the following cases :

1. To assist a turning movement.

* *Times History of the War in South Africa.*

† A Japanese machine gun fired 25,000 rounds in one day in Manchuria.—AUTHOR.

2. To reinforce a distant flank.
3. To repel a counter-attack.*
4. To hold a captured position.

When the infantry reach close range, the point for the assault will have been selected and the reserves massed behind this point. When the reserves have been thrown in, and the fire fight has reached its height, the moment will have arrived when one side or the other will obtain superiority of fire. "*The climax of the infantry attack is the assault which is made possible by superiority of fire.*" † To assist in the attainment of this superiority of fire is the true rôle of machine guns with infantry, and, as their beaten zone at short ranges is so small, they can safely fire over the heads of prone infantry, even when the latter are within a hundred yards of the target. The guns should now be pushed up to the closest ranges, and fire of the most rapid description concentrated on the point of assault. When it is remembered that the machine guns of a single Infantry Division, as at present organised, can bring a fire of more than ten thousand shots a minute from close range where its accuracy is assured, at this crisis, there will be no need to say any more on the tactical importance of the probable result.

In bringing machine guns into action for this purpose they will generally be used in batteries, but may come into action in sections or even single guns, once the objective has been pointed out. The object being to obtain

* This has been a feature of their use in the present war in France.—AUTHOR.

† *Field Service Regulations*, Part I. Reprint 1914, p. 144.

superiority of fire regardless of cost, rapidity and concentration of fire must be the principal points. The guns must therefore press forward to the closest range, and where it is possible to bring a cross or enfilading fire to bear, the opportunity must not be neglected. It may be necessary to fire over the heads of the infantry or even to push guns into the firing line itself, though this is seldom desirable if good positions can be found in rear. When any portion of the line advances to the assault, fire must be concentrated over their heads on the position assaulted; and when they are so close to the position as to render such fire impossible, fire must not cease, but be directed over the position so as to strike the enemy as they retreat. Fire from machine guns may be kept up from 600 yards' range over the heads of prone infantry within 200 yards of the target with perfect safety, and from 800 yards over infantry advancing to within the same distance. General Nogi, speaking of the use of machine guns in the attack, says: "Our troops trained machine guns on the most advanced lines of infantry to *overwhelm with fire the points at which resistance was greatest*. Sacks of earth were used to mask them. *They have often enabled the infantry to advance with success.*" M. Ullrich, war correspondent of the *Gazette de Cologne*, was present in many engagements in which machine guns were pushed up to support the firing line in the final stage. He says: "In the offensive the Japanese frequently made successful use of machine guns. *When the infantry were carrying out a decisive attack, they were supported by their machine guns, which concentrated their*

fire on points arranged beforehand. . . . When machine guns have been skilfully employed, their action has been infinitely more effective than that of field artillery, more especially when they fire at infantry ranges." The following is an example of their actual use in this way. "The Japanese," says a Russian eye-witness of the fighting round Mukden, "brought up during the night dozens of machine guns with hundreds of thousands of cartridges to their front line of skirmishers, from 400 to 500 yards from our positions, and entrenched them there. *When the assault commenced, at dawn, the machine guns opened fire with fatal accuracy on the parapets of our trenches and on our reserves, preventing them from coming up. We could do nothing with the enemy, because, when the machine guns showed the least vulnerability, they were at once protected by shields of bullet-proof steel.*" *

The machine guns of the enemy will all be in action during the final stages, but they should not be engaged by the machine guns of the attack except when exposed. They are very difficult to put out of action by small-arm fire at any time,† and when employed by the defence are sure to be well concealed and provided with cover. It is the duty of the artillery to silence machine guns, and this was so far recognised in the war between Russia and Japan that the latter brought up mountain guns on

* *Mitrailleuses à l'étranger*, par Lieut. M.

† Machine guns have been put out of action many times in the present war by concentrated infantry fire and by picked marksmen "stalking" the gun.—AUTHOR.

more than one occasion to silence the Russian machine guns.

At Kinsan, on June 26th, 1905, when the Japanese were attacking the position, the Russians brought up two machine guns against the 43rd Regiment and a mountain battery at 3 p.m. The battery at once silenced the machine guns, and by 5.30 p.m. the hill was in the hands of the Japanese.* Captain Niessel of the Russian Army gives another instance. "It was on August 31st at 7 p.m. that the Japanese decided to drive the machine guns out of the village of Goutsiasi by *artillery fire*. Knowing that their infantry had been checked, they posted at the village of Datchaotsiati a battery which showered on us shrapnel and high explosive shell. Although the men had taken cover behind a wall of earth, we had many wounded and could not breathe freely until nightfall, when the enemy ceased their fire, to which *we could not reply on account of the distance*. At 9 p.m. I was ordered to evacuate the position."†

The moment the infantry assault is successful, the machine guns must be pushed forward into the captured position to secure the ground gained and to repel counter-attacks. As the confusion at this moment will be considerable, it will seldom be possible for the machine-gun commander to receive orders from the G.O.C., but this must not prevent him from immediately directing guns to occupy and quickly entrench themselves in positions

* *The Great Siege*, by W. Norregaard.

† Captain Niessel in *Enseignements techniques de la guerre Russo-Japonaise*.

which it may appear vital to secure, and to order the remainder of the guns not so required to follow and fire on the enemy wherever he may show signs of rallying. In order that these two distinct duties may be carried out instantly and without confusion, it will be advisable to tell off beforehand those batteries that are to pursue the enemy.

Theoretically every available gun should be launched in the pursuit, but the recent war between Russia and Japan has shown how often a position that has been stormed and captured has been retaken by a rapid counter-attack before the attackers have had time to rally and prepare to hold what they have taken. Machine guns can render a position safe from counter-attack so quickly and effectually that this duty should be the *first* consideration of a machine-gun commander with infantry in the assault.*

Fresh ammunition must be brought up, and every endeavour made to conceal the guns and construct good cover from any material found in the position.

"During the battle of Mukden, on the evening of March 1st, a position at Sha-shan was captured by the Japanese. The Russians had taken up another position some 500 yards in rear, from which they opened an effective fire upon the Japanese infantry in the captured position. Another Russian force about 1,000 yards farther to the west threatened their flank. The Japanese, however, succeeded in bringing up *the machine guns which had taken part in the attack, and brought them into action*

* See page 131, the instance at Neuve Chapelle.

under cover of a number of sandbags abandoned by the Russians. The effect was decisive: all counter-attacks failed before the annihilating fire of the machine guns." *

IN THE DEFENCE

When infantry are acting on the defensive, it is advisable that the majority of the machine guns should be held in reserve, and used to check turning movements, to reinforce distant portions of the line of defence, and to deliver counter-attacks; but their principal rôle will be the repelling of the assault. Guns allotted for this purpose must be placed in very carefully selected positions in the line of defence, from which they can command narrow approaches, and sweep ground in front of trenches or important works by cross-fire, especially any dead ground likely to afford temporary cover to the attackers. Concealment is of the first importance, and cover from fire absolutely necessary, but the combination of the two requires great skill both in choosing positions and in constructing an inconspicuous shelter. In certain positions where the country is flat or undulating, and has no abrupt features, pits will be found the best form of cover; but where the ground presents marked features, emplacements providing overhead cover will not only conceal the guns, but render them immune from shrapnel. The Japanese used these emplacements with great success, the guns often remaining concealed even when the enemy were within 300 yards."

The positions for machine guns should not be in one

* Captain von Beckmann.

and the same line, and they should be placed at wide intervals. At least two positions should be provided for each gun, and a second series of positions in rear, commanding those in front, should also be provided. The machine guns should be allotted to their positions by sections, each gun being so placed that its fire crosses that of the other when possible. Section commanders should be responsible for having all ranges from their respective positions taken and written up in each emplacement. They must arrange with the O.C. of that portion of the position to which they are allotted the time and signal (if any) for opening fire ; the exact moment should be left to the discretion of the section commander as a rule, the O.C. merely indicating the stage of the attack up to which fire is to be reserved, and great care should be taken not to open fire before this stage has been reached. Every endeavour should be made to ensure co-operation between the machine-gun units in reserving fire till the shortest range has been reached by the attack and a really good target presented. Nothing can justify a machine gun opening fire from a concealed position until its fire will give the best results that can be expected from that place, and to ensure this it is necessary that the target is big and vulnerable, the range close, and the fire unexpected by the enemy. Captain von Beckmann, speaking of the Russo-Japanese War, says : " Premature fire upon unsuitable targets at long range is to be deprecated. The greater the surprise, and the shorter the time within which heavy loss is inflicted, the greater the moral effect produced. At the battle of Hai-kou-tai

on January 27th, 1905, a Japanese company attacked Sha-shan. Four Russian machine guns *opened fire at about 1,100 yards upon the extended firing line, without causing any serious loss or affecting its advance.* On the other hand, the Japanese on March 1st had *approached to within 200 or 300 yards of the Russian position at Wangchia-wo-pang and were beginning the final assault. Two Russian machine guns suddenly came into action, and the Japanese assault was repulsed with heavy loss owing to the annihilating fire."*

These two instances well illustrate the right and wrong way of using machine guns in the defence. Where a battery is allotted to one section of the defence the guns should be distributed two or four along the front and one or more on each flank. Single guns may be used in the defence where a section cannot be spared, as the assistance of a supporting gun is not essential to its safety when behind entrenchments. In the first instance guns may be kept in rear of the position until the direction of the attack has been ascertained, provided they are able to occupy their positions unseen.

Machine guns at salients and on the flanks are of great value in defending a position.

If sufficient machine guns are available, one or two batteries should be reserved for the counter-attack. They should in this instance be pushed right into the firing line when necessary and used with the greatest boldness. It will be their duty to cover the retirement of the infantry in the event of a repulse, and for this purpose positions in rear should have been selected beforehand.

Although the principle of reserving machine guns in the defence must be strictly adhered to, there may be occasions when the use of a battery or two well in front of the defensive position will compel the enemy to deploy prematurely, cause him loss, and delay his advance. Machine guns so used may also find opportunities for surprising artillery while unlimbering, and thus render great service to the defence. They should be withdrawn when their mission is accomplished, and be reserved for further use as already indicated. The following are examples from the Russo-Japanese War of the use of machine guns in the defence of a position.

General Nogi has written : " Our most formidable foes were wire entanglements placed 100 yards in front of the Russian trenches, well lit up by search-lights and covered by the murderous fire of machine guns. The defenders made use of them to flank dead ground in their front and also had them at other points, kept carefully in reserve and under good cover, to make use of continuous fire against the attackers at the moment of the assault."

" On January 28th, 1905, near Lin-chin-pu at about 7 p.m. the Japanese attacked the forts of Vosnesenski and the trenches near by, in which were posted two machine guns. *These latter opened fire at 200 or 300 yards on a Japanese company in line. In one or two minutes they fired about 1,000 rounds, and the Japanese company was annihilated.*" *

" At Mukden, on March 1st, the left of a Japanese Division *being within 300 yards of the enemy's position and*

* Von Ullrich.

about to assault, the Russians suddenly opened a very heavy machine-gun fire *from cleverly concealed positions, causing such loss that the Japanese attack was temporarily suspended.* On August 20th, 1904, the Japanese captured a lunette near the village of Shin-shi after severe fighting. *The Russians made a counter-attack with three machine guns, and drove the Japanese out again with a loss of over 300.* The three machine guns retired from the lunette before the attackers got home, and, taking up a position behind the open gorge of the work, showered such a hail of bullets on the victorious Japanese that they were compelled to retire." *

"On February 27th, 1905, the Russians tried to surprise the railway bridge over the Sha-ho on a very clear night, when one could see as far as 500 yards. Four Japanese machine guns opened fire on a company of the 10th Light Infantry, which was almost wiped out." †

At the battle of Hei-kow-tai, the Russians at Shen-tan-pu made no less than five determined attacks against the Japanese entrenchments, in which was a machine gun, but were repulsed each time. The machine gun is said to have done great execution, and *one thousand dead Russians were reported to have been found before it.* ‡

The 8th Division of the Japanese Army are reported to have made several fine attacks upon Hei-kow-tai, *but were each time repulsed mainly by the fire of the Russian machine guns.* § The same report says: "Throughout the

* *The Great Siege*, by W. Norregaard.

† Von Ullrich, War Correspondent of *Gazette de Cologne*.

‡ British Officer's Report, Russo-Japanese War.

§ *Ibid.*

campaign in Manchuria the Japanese have suffered severely in attacking those points of the Russian front which have been armed with machine guns," and proceeds to quote an episode in the operations of the 5th Division at the battle of Mukden, to show to what lengths the Japanese went in order to silence these weapons. It appears that the Japanese were so galled by the fire of four machine guns that the attack was materially affected. They decided to bring up two mountain guns to within 500 yards of these machine guns, to try to destroy them. The mountain guns were brought up behind a wall and fired through two holes bored for the muzzles. Two machine guns were at once destroyed, but so well had the others been concealed that they were able to be withdrawn in safety.

Sufficient has been quoted to show that both the Japanese and Russians made the greatest use of machine guns in the defence, and that when employed on sound tactical principles they not only afforded material assistance, but were often the predominant factor. On the other hand, when these principles were neglected or ignored, the machine guns merely wasted ammunition and were impotent to affect the situation. The lesson to be learned is this : *that machine guns are only useful when their tactical handling is thoroughly understood, and then their effect is more decisive than that of any other arm.*

Since the above words were written six years ago, an incident at the battle of Neuve Chapelle confirms this statement in a very remarkable way. There is no account of the action available yet, but the bare state-

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ment contained in the *London Gazette* gives enough to show that personal reconnaissance and a thorough knowledge of the tactics of his weapon, enabled this officer not only to earn the D.S.O. for himself, but to render immense services in repelling the great German attack. It is interesting to note that Captain Lodwick learned his tactics at the Central School of Musketry in India, where he was an Assistant Instructor when the war broke out.

The *Gazette* said: "For conspicuous ability and gallantry as brigade machine-gun officer, from March 10-13, 1915, at Neuve Chapelle. He reconnoitred the captured positions from end to end and brought twenty machine-guns into position, which caused an immense number of casualties to the enemy when they attacked on March 12."

ATTACKING MACHINE GUNS

As already pointed out, it is useless for machine guns to attack each other—the result is likely to be a prolonged duel, which will generally be indecisive.

Artillery is able to at once knock out a machine gun, if it can be seen and the range is not a long one, but a direct hit is necessary, and this is seldom possible with the first few shots, during which the machine guns should have no difficulty in getting under cover.

Rifle fire from the firing line will have little effect against a machine-gun for the same reason—the gun can be instantly withdrawn.

Where a unit of sufficient strength to ensure smothering the machine-gun with bullets from the first is able to

surprise a machine gun at a known range of *and* take yards, it will be able to put it out of action. *of retreat*

This has been done more than once in war. *g machine*

The following factors are absolutely essential *retreat, as*
(1) At least two sections (25 men). A plat' quoted in
(2) Range known and not more than 1,00 *secure vital*
(3) Surprise, *i.e.* machine gun unaware *commanding*
unit. *with*

(4) Fire opened simultaneously by whole unit.

If any of the above are wanting, the machine gun will either escape by being quickly withdrawn under cover, or the fire will be returned with the probable result of the discomfiture of the attacking unit.

The best and most certain way of attacking machine guns is to do so with three or four picked shots who will stalk the machine gun from different points, and open rapid fire from so close a range as to make certain of hitting every man who attempts to approach the gun. Men who have been trained at fine shooting with peep sights, and can depend on firing 8 shots in 40 seconds and making a hit every time, will always be able to knock out a machine gun, provided the ground permits their approach unseen to within 400 yards.

It is probable that the success obtained by Bisley marksmen with accurate rifles in stalking machine gun—"snipers," etc.—in the present war, will cause a revival in the art of fine shooting, and special "Sharpshooters," may be encouraged or even officially recognised in the future. *gun.*

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CHAPTER VI

IN THE FIELD WITH INFANTRY (*contd.*)

THE RETREAT

THE reply of the British drummer-boy when asked by the great Napoleon to 'beat the "Retreat" is historical, and, following the traditions of the British infantry, the word will not be found in the index of *Infantry Training*. Nevertheless, although British infantry never retreat, they may be called upon to perform that most difficult operation of war—"a retirement in the face of the enemy."

Field Service Regulations, Part I., 1909, Reprint 1914, speaking of the retreat says: "The cavalry and other mounted troops, aided by a strong force of artillery, will meanwhile check the enemy's advance, and the remainder of the force, with the exception, if possible, of a rear guard in support of the mounted troops, will move as rapidly as possible to the shelter of the rallying position and there reorganise. Steps should be taken immediately to secure bridges, defiles, or other vital points on the line of retreat at which the enemy's mounted troops might intercept the force. Commanders of retreating troops must recognise that their greatest danger will arise from attacks delivered by the enemy's mounted troops and

horse artillery; if possible, therefore, they should take precautions *that all ground commanding their line of retreat is occupied by flank guards.*"

There are three distinct ways of employing machine guns with infantry to assist in covering the retreat, as will be seen from the portions of the above quoted in italics: viz. (1) With the rear guard; (2) To secure vital points on the line of retreat; (3) To occupy commanding positions on the flanks. The use of machine guns with the rear guard will be dealt with separately, so we will see how they should be employed to fulfil the two latter duties.

Let us suppose that the moment has arrived when the commander of the force decides to break off the engagement and to effect a retreat. We have already seen how the cavalry and their machine guns will co-operate, and we may assume that their intervention will enable the infantry to break off the fight under cover of the fire of the rear guard and their machine guns. In anticipation of this, the commander of the machine-gun batteries—other than those allotted to the rear guard—will assemble them in a central position and receive from the commander of the force his plan of action and instructions for the co-operation of the machine guns. These instructions should definitely state the positions to be occupied on the line of retreat, and for how long such positions are to be held (e.g. until the infantry are past such and such a place, or to the last possible moment, etc.); but they should leave all details as to unit of guns, fire positions, opening fire, etc., to the machine-gun-

commander, who should be given a free hand in carrying out his instructions. The machine-gun commander will then issue his orders to battery commanders, allotting the battery for the flank and the battery which is to occupy positions on the line of retreat. In like manner the battery commander will tell off sections to occupy certain positions, if these have already been selected, and if not he will direct his battery to a position of readiness and will gallop off with his section commanders to select the positions for each section and explain the course of action to be taken. The position of readiness must be in the vicinity of the position to be occupied, and section commanders must take steps to ensure that their sections keep in signalling connection with them and can be brought up by signal to the position selected.

The choice of the position will depend upon the nature of the country and the features favourable to delaying the enemy, but it may be laid down that the machine guns should not be placed in one line, but should be broken up as much as possible, so that no two guns are at the same range. In the same way, guns placed in well-concealed positions on the lower slopes of hills should have the other guns of their sections higher up, where they can command a wide extent of country and at the same time cover the retirement of the guns below. All guns must be so placed that they can be *retired under cover of the ground immediately they move.* The guns on the higher ground will open fire at long range, and the opportunity may be afforded at this stage for using "deliberate" fire at the most rapid rate possible, in imitation of rifle

fire, for the double purpose of concealing the guns and deceiving the enemy by causing them to believe that the position is held by infantry. The guns at the lower position should watch their opportunity for opening fire on a large and vulnerable target; but, should none be presented, it is possible, by reserving fire, to catch the enemy in close formation should they press on when the guns have ceased fire, thinking the position has been vacated.

It may be possible to surprise the enemy from close range at bridge-heads or on roads through defiles leading to the line of retreat, if guns are carefully concealed in positions commanding such approaches. Indeed, the opportunities for ambushing pursuing cavalry or infantry will be frequent during the early stages of a retreat, and no chance must be lost of making the enemy pay dearly for his temerity during the pursuit. One successful ambush by machine guns is worth more than the most stubborn stand, for it imposes caution as nothing else can; and caution in the pursuit means delay, and delay spells failure. When machine guns get a really good target at close range the result is little short of annihilation, and the moral effect of such a heavy loss, totally unexpected and inflicted in a few moments, takes the life out of the pursuit more completely than even a long stand.

The machine guns allotted to the flanks will find positions in the way already described. These positions must be chosen along the line of retreat so as to hold all ground from which fire can be brought to bear on the

retreating columns, and from which the enemy can be successfully repulsed when he attempts to break through. If there has been time to form infantry flank guards, the machine guns will assist in strengthening their resistance, and in covering their withdrawal. When acting alone they should open fire on suitable targets at the longest ranges, but when supporting infantry they may be able to reserve fire and surprise the enemy from close range. Guns working together on a flank must keep in touch with each other by signal, and guns should work in sections in mutual support. A battery acting as a flank guard to a force retreating must be prepared to occupy a front of some two or three miles, and sections will often be in positions a mile apart in open ground. Directly the guns have taken up positions the battery commander should go off with scouts from each gun and select fresh positions along the line of retreat. He will give the signal for retirement, and if in action at the time one gun of each section should move off first under cover of the fire of the others; or, where the situation permits, a flank section may be ordered to move first. It must sometimes occur that the cavalry on the flanks will be compelled to retire by a superior force, and when this is the case machine guns in position may be able to inflict considerable loss should the pursuing cavalry follow them too closely while retiring.

As soon as it is known that the main body has reached the rallying position and is ready to hold it, the machine guns can be withdrawn. This will not usually be possible in daylight, and as a rule it will take place after dark.

The dispositions of the machine guns in the rallying positions will be the same as in the case with infantry in the defence.

REAR GUARDS

The prime necessity for the machine guns with a rear guard of a retreating force is mobility, and without this they will be of little service and become a hindrance rather than a help.

"A rear guard carries out its mission best by compelling the enemy's troops to halt and deploy for attack as frequently and at as great a distance as possible. It can usually effect this by taking up a succession of defensive positions which the enemy must attack in turn. When the enemy's dispositions are nearly complete, the rear guard moves off by successive retirements, each party as it falls back covering the retirement of the next by its fire. This action is repeated on the next favourable ground. . . . A rear guard may also effectually check an enemy by attacking his advanced troops as they emerge from a defile or difficult country." *

Machine guns, by reason of their concentrated fire and shallow beaten zone, are peculiarly suited for compelling troops to deploy at long range. They are also suited for quickly taking up a defensive position, and, when mobile, can instantly cease fire and move off in a few moments with considerable rapidity.

Their power for suddenly developing an intense fire

* *Field Service Regulations, Part I., 1909. Reprint 1914, p. 100.*

will enable them quickly to overwhelm an enemy caught "emerging from a defile or difficult country." It would appear therefore that the machine guns are far more fitted than infantry to perform the duties of a rear guard as quoted above.

"The first consideration in selecting a position for the artillery is that it shall be able to open fire on an enemy at long range, and thus compel his infantry to assume an extended formation at the greatest possible distance. The second is that it should be possible to withdraw without difficulty." *

When the infantry arrive within effective rifle range of the artillery, the latter will be compelled to retire, especially if the former are supported by cavalry. This will also be the moment when the infantry will require to retire to a fresh position in rear. Machine guns that have been well concealed, or which have taken up fresh positions in good cover in rear of the infantry line, should be able to unmask and by their fire hold off the enemy until both guns and infantry have effected their retreat. The facility with which they can traverse and sweep widely extended lines, and instantly concentrate fire on any portion of it, makes them of great service in covering a retirement at effective range, as they can render the hottest fire ineffective and aimed fire impossible for a short time.

Machine guns with a rear guard must be prepared to work from place to place with great rapidity, and for this purpose they must arrange to bring the gun horses

* *Field Service Regulations*, Part I., 1909. Reprint 1914, p. 101.

close up to their fire position. Alternative positions are essential, but must be reached under cover and unobserved by the enemy. Sections will act independently, using their guns in mutual support; but the retirement of one section may often afford another the opportunity, from a well-chosen position on a flank, to surprise the enemy from close range as they press forward to occupy the abandoned position.

A ruse that may sometimes be successful where guns are really well concealed is to bring up the gun horses and retire at a gallop by a pre-arranged signal all along the position, while leaving one gun of each section still in position but flat on the ground, where it will be completely concealed even from glasses. This is almost certain to draw a hot pursuit, especially if the artillery and infantry have retired previously, and if fire is reserved till close range a severe check may be administered to the enemy. "Skilfully laid ambushes will cause the enemy to move with caution in pursuit." *

Machine guns should never retire for a few hundred yards, except where absolutely necessary for covering the retirement of those in front. Once in position, they should only be moved to alternative positions when discovered, and these will usually be more or less on the same general alignment. When they retire they should move to such a distance in rear as to give them time to select, or if necessary improvise, good cover in the new positions and to replenish ammunition, etc. "The positions should be sufficiently far apart to induce the

* *Field Service Regulations*, Part I., 1909. Reprint 1914, p. 103.

enemy, after seizing one, to re-form column of route before advancing against the next." *

General Alderson, speaking at the Aldershot Military Society in 1904 and referring to the South African War, said: "I had two Maxims with tripod mountings on pack-saddles, which belonged to the 1st Battalion Mounted Infantry. These guns had well-trained mounted detachments, and a pushing officer, with a good eye for ground, in command. *They were most useful, and more than once saved the flank of their unit from being turned by galloping up and coming into action on the flank of the out-flanking Boers.* . . . I am of opinion that if the most is to be got out of the guns, the detachments, *even with infantry*, should be mounted. . . . With the detachment mounted . . . there is no question about the guns not keeping up, and they can be sent quickly to any desired position. They can hold on to any such position as long as required to *cover the advance or retirement of their infantry*, and then easily catch them up or get into another position. In fact, if the detachment is mounted the value of the guns is more than doubled."

Machine guns with the rear guard will certainly be exposed to artillery fire, and they will seldom have the time or opportunity for making sufficient cover to protect themselves. It will be necessary therefore either to withdraw the gun on coming under artillery fire or to find shelter from it. If good natural cover has been obtained, it will only be necessary to lower the gun flat on the ground behind it, and for the detachment to lie

* *Field Service Regulations*, Part I., 1909. Reprint 1914, p. 102.

flat close against it, when they will be practically safe. The artillery will cease fire as soon as they find there is nothing to fire at, but the detachment should not move for some time after this, as the guns, having got the range, will be able to inflict considerable damage if the detachment exposes itself.

It is always advisable to keep one or two sections in reserve with a rear guard to be used to protect the flanks or any point where the pursuit threatens to break through in the manner mentioned by General Alderson. These sections should remain with the rear-guard commander and be under his immediate command; they should be in readiness for instant action.

OUTPOSTS

The duties of the outposts are :

- (1) To provide protection against surprise.
- (2) In case of attack, to gain time for the commander of the force to put his plan of action into execution.*

The first duty of outposts, which is *reconnaissance*, cannot be assisted by machine guns; but their second duty, which is *resistance*, may be materially strengthened and aided by them, as we have already seen in dealing with the defence. Little can be said about tactics, and it will be necessary to use the guns in positions on the line of resistance where their fire power is most likely to be of value. In order clearly to understand where and how machine guns should be used with outposts, it will

* *Field Service Regulations*, Part I., 1909. Reprint 1914, p. 104.

be necessary first to examine the composition and distribution of outposts of a force of all arms. *Field Service Regulations*, Part I., 1909, Reprint 1914, says: "When there is any possibility of a force coming in conflict with an enemy, its commander, when halting for the night, should first decide on his dispositions in case of attack, and then arrange the quartering of his command and the position of the outposts accordingly. . . . Command, co-operation, and intercommunication will be facilitated by placing the advanced troops along well-defined natural features, such as ridges, streams, the outer edges of woods, etc., or in the vicinity of roads; but this must not be allowed to outweigh the necessity for making the best tactical dispositions possible. In enclosed country, and at night, the movements of troops are generally confined to the roads and tracks, which should be carefully watched. If the outpost position is extensive, it may be divided into sections, each section being numbered from the right. The extent of a section depends upon the amount of ground which can be supervised conveniently by one commander. The extent of frontage to be allotted to each company will depend on the defensive capabilities of the outpost position, and, where they exist, on the number of approaches to be guarded. The outpost position will invariably be strengthened and communications improved where necessary. Piquets and supports will do this without waiting for definite orders. . . . The outposts of a force of all arms consist of outpost mounted troops, outpost companies, and, where necessary, the reserve. Machine guns will generally be included and

sometimes artillery. . . . When stationary, the duty of local protection will fall almost entirely on the infantry, most of the outpost mounted troops being withdrawn, their place in this case being with the reserve, if there be one. In certain cases, however, standing mounted patrols may be left out at night with advantage. . . .

“Machine guns with outposts may be employed to sweep approaches, and to cover ground which an enemy in advancing may be compelled to pass or occupy.” *

Machine guns must be used on the principles given above, which naturally fall under two distinct headings, viz. use by day and use by night. Machine guns with outposts by day will not occupy their fire positions unless an attack is imminent, but should be posted with the reserves in their own section of the defence. This must not prevent emplacements or pits for the guns being made, ranges carefully taken and written up, and everything being ready in case of action. These positions and the subsequent action will correspond so closely with those already suggested for infantry in the defence in the last chapter, that they need not be repeated. By night, however, the case is very different, and it is necessary to select very carefully the position of each gun, so that it commands a road, a bridge, or other ground which the enemy in advancing may be compelled to pass or occupy. These places must be selected in order of importance, and an endeavour made to leave no approach by which a body of troops might move uncovered by fire. The machine guns must occupy their positions before

* *Field Service Regulations*, Part I., 1909. Reprint 1914, p. 105.

dark and be carefully laid to sweep the area of ground necessary for protecting the position, the angle of elevation of the gun being taken by clinometer afterwards in order that it may be relaid if necessary in the dark.* Great care must be taken to conceal these guns from observation when bringing them into position or withdrawing them, and it is worth while going to some considerable trouble to do this. One method of many is suggested to show what is meant. Field guns might be placed in the positions by day and withdrawn before night, the machine guns being brought up on the limbers and dropped in the position behind a screen of brushwood, and withdrawn again in the morning when the field gun is brought up.

The detachment of each machine gun must find two double sentries and their reliefs, who will remain at their posts with the gun, which should have the belt ready in the feed block, but not actually loaded. These men may either take it in turn to stand to the gun or both be directed to watch. When there are no infantry sentries on piquet duty in front of the gun, it will be necessary to detail two who will be posted in the usual way some little distance in front of the gun to prevent it being rushed in the dark. The method of preparing the sights and laying the gun for night work is given in Chapter VII.

The value of machine guns with the outposts at night is shown by an incident at the Battle of Mukden, March 6th, 1905. Two Russian battalions made a night attack

* A better method is to use the night-firing box: see p. 153.

against the hill north of Tung-chia-wen, which was occupied by the 2nd Japanese Regiment. There was no moon and the night was very dark. Two Japanese machine guns did great execution at ranges between 50 and 100 yards, and the Russians were repulsed with a loss of 450 men, the Japanese casualties being only 48.

CHAPTER VII

EMPLOYMENT IN FORTRESS WARFARE *

THE siege of Port Arthur by the Japanese and its defence by the Russians have thrown an entirely new light on Fortress Warfare. Although the main principles of the attack and defence remain unchanged and the primary armament of both is still the heavy artillery, the improvement of small-arms, their great range and rapid fire have materially altered the nature of the fighting in the later stages and during the assault. The result of this has been to prolong the defence after the fortress has been dismantled by the bombardment, and to render the storming of a single breach an operation no longer possible in war. The machine gun is largely responsible for this; and when high-explosive shells have destroyed the fortifications and disabled the artillery, the stormers will be met by rifle fire and that of machine guns concealed among the ruins of the works. The intensity and accuracy of this fire will be such as to result frequently in the complete repulse of the assault, and even when the glacis of a work has been occupied it may be several weeks before the capture of the work itself is effected.

* The trench warfare in France is very similar to siege operations and the use of machine-guns is much the same in both.—AUTHOR.

Machine guns are particularly suited to the defence of fortresses during this period, and Sir G. S. Clarke, in his book *Fortification*, says : " The fire of the Maxim gun, delivering about 700 bullets a minute,* can be directed by one man, who need not show more than his head (easily shielded) above the parapet, the feed being tended by another man completely under cover. In the special qualities of the machine gun there is a distinct advantage to the defence, arising from the fact that *an intense fire over a particular area can be suddenly developed by a few men occupying a small space*. This, in the case of night attacks especially, is a valuable quality. At Port Arthur the Russians in some cases employed machine guns with good effect, concealing them so that their fire came as a surprise to the assaulting parties. Their portability renders them well suited for the defence of positions, and they will doubtless form an important element in the armament of fortresses."

Speaking of the difficulty of " storming " the modern fortress, the same author says : " The *vive force* school proposed therefore—on paper—to shell them heavily and then storm, trusting to incomplete organisation and general unpreparedness. There is little or nothing in military history to bear out the views of this school, and modern experience is entirely against them. Only one such attempt was made in 1870–1, against the indifferent provisional works of Belfort, garrisoned mainly by *Gardes Mobiles*—and this failed completely. The tremendous assaults on the defences of Port Arthur may

* Between 400 and 500 is the usual rate of fire.—AUTHOR.

have been partially inspired by the German teaching; but the results were discouraging, although the devoted and sustained gallantry of the Japanese could not be surpassed and probably would not be equalled by any European army."

The machine guns of a fortress should be divided into two classes—the stationary and the mobile guns. To the former will be allotted the defence of distinct portions of the permanent works, and they will be provided with cone and parapet mountings,* the former being fixed and the latter capable of being moved within the work to which it is allotted.

The mobile guns should be mounted on a light tripod and carried in a low-wheeled hand-cart, or they may be mounted on a very light two-wheeled carriage capable of being drawn by one man and having wheels of small track, which can move over the narrowest roads in the fortress. These mobile guns should not be allotted to any particular work, but to the garrison other than those within the forts, for use in repelling assaults and making counter-attacks.

We will deal first with the stationary machine guns. It will not be necessary to provide a machine gun for each cone mounting, as the guns can be easily carried from one cone to another as required. Shields should be used with all stationary mountings, but must be detachable, and should not be placed in position until required, as they indicate the situation of the gun and are easily destroyed by artillery.

* See *Handbook for 303 Machine Guns*, pp. 88-9.

The positions for machine-gun mountings in a fort must depend on the size and construction of the work, the nature of the outer defences, and particularly on the supporting works in the immediate vicinity. Positions commanding the glacis and the entanglements, on salients of works and enfilading ditches, and any dead ground where the enemy may effect a lodgment, are suitable. Counterscarp galleries at the angles of works flanking the ditch should invariably have machine-gun positions, with a special loophole, long and shallow, to enable them to sweep a wide area with fire.

The selection of the positions for machine guns in permanent works belongs to the art of the engineer, and there is little that can be said of their tactical employment. Fire should be reserved until the attack has reached close range, and then only opened when the target is large and vulnerable. Guns must be concealed by every possible device and all the loopholes must be blinded. By night all guns should be mounted and trained to sweep ground by which the enemy must approach ; * when searchlights are not in use the elevation should be checked by the use of a clinometer, and the amount of traverse may be shown by chalk lines on the parapet, or white stones placed in two rows. In this way accurate fire may be brought to bear on the assault on the darkest night, and many night attacks were repulsed with machine-gun fire by the Russians at Port Arthur. Sir G. S. Clarke says: "The front faces of the forts were retrenched in some cases by obstacles and a line of field

* See page 153.

parapet across the terre-plein. *These, with the assistance of machine guns brought up at the last moment*, enabled assaults of the breaches formed by the mines to be repulsed." Again, "The Russians used machine guns with effect, frequently concealing them in light blindages, so that their positions could not be detected until they were brought to bear upon an attacking force."

The war correspondent Mr. F. Villiers, in his book *Three Months with the Besiegers*, speaking of the storming of West Panlung Redoubt,* says: "The death-dealing machine guns of the Russians *in the casemates of the fort* are playing ghastly havoc—such havoc that only a score or more of Ouchi's battalions reached the first ditch of the fence, where they threw themselves panting into the grateful cover of the pits their own artillery have torn."

The number of machine guns allotted to the permanent works of Port Arthur is given as 38 by the United States Official Report, while Nojine, in *The Truth about Port Arthur*, gives them in detail as 28, the distribution of which is shown in red figures on the map at the end of Chapter VIII. The ten guns unaccounted for were probably mobile, and used for the defence of the harbour and the various landing-places in the neighbourhood of the fortress.

The mobile machine guns of the fortress will be used on the advanced line of defence with the mobile troops, and should be divided into two—those allotted to the outposts and those allotted to the local reserve.† Those

* See map; the Japanese name for this work is Ban-ru-san Nishi Hodai.

† See *Field Service Regulations*, Part I., 1909. Reprint 1914, p. 178.

allotted to the outposts must be placed in carefully selected positions commanding the approaches to the section of the defence to which they have been posted. These positions will usually be in minor works such as redoubts, emplacements, and lunettes, and they will be selected for their good field of fire, particular attention being paid to their command of dead ground in front of other works. Great care and trouble must be taken in concealing the guns and providing them with good cover, not only from rifle fire, but also from artillery. An endeavour should be made to command all wire entanglements along the front with machine guns, and the angles of traverse of each gun should be carefully laid off and marked in white paint or tape, so that they may be used in the dark accurately to sweep their area of ground. Too much stress cannot be laid on the importance of the accurate laying and sighting of machine guns by day for use at night, and it must be remembered that they are the only weapons which are capable of bringing a rapid and concentrated rifle fire on a particular spot in the dark, and are therefore invaluable to the defence during a night attack.

Accurate fire may be brought into any part of the defensive line or on to approaches, such as roads, bridges, fords, etc., by the use of night-firing boxes.

The night-firing box consists of a small box about a foot square on one side of which a piece of thin calico or other white material is stretched.

Three vertical black lines are painted on to the calico, or black tape $\frac{1}{8}$ in. wide nailed across, $2\frac{1}{2}$ in. apart; three.

horizontal lines are put on in the same way, so that they intersect in the centre.

The box is placed on the ground exactly 10 yards from the gun in the line of the ground to be fired on. The exact positions of the gun and the box must be marked by pegs.

The gun is now laid on the ground it is desired to sweep, with the correct range on the sights—for instance, a bridge at 400 yards—and then the tangent sight is raised until the sights are aligned on the centre line on the box where they intersect; but *without altering the laying of the gun.*

If at night the gun and box are placed in the positions marked by the pegs, and a lamp or candle is put in the box, the calico will be illuminated, and the black lines will be clearly seen.

If the sights are now set for the elevation which cut the crossed lines when the gun was laid on the bridge, accurate fire may be brought on the bridge in the dark.

The other lines will give 2 ft. per 100 yards elevation or deflection, so by their aid it will be possible to sweep sections of the front or search the length of the bridge.

Several boxes can be used in this way to command different points, and in this manner the gun can be used as accurately in the dark as by day.

The detachments of guns on outpost duty at night should be told off into three watches of two men each, whose duty it will be to remain with the gun in readiness for instant action. The gun should be loaded and laid, and the men on duty should watch the front. Where the

gun is in an emplacement or other loopholed work, one man should watch through the loophole in turns of half an hour at a time. The strain of peering into the dark and listening for the sound of an approach at night is so great that no man should be required to do this duty for more than half an hour at a time, while the chance of a man dozing during a short spell is much reduced and the acuteness of the senses has not time to get dulled. Very strict orders must be given to insure that fire is not opened prematurely; and where infantry sentries are on duty near the gun, it may be advisable not to load the gun, but merely to insert the belt in the feed-block in readiness.

It is always advisable to have the gun ready for any emergency at night, and the following will be found an effective method of preparing the sights for aiming in the dark. Cut a piece of white paper, previously prepared with luminous paint, into the shape of a triangle, and paste it on the slide of the tangent sight so that the apex of the triangle touches the bottom of the V of the sight. Cut also a circular piece of a size that will fit on the foresight just below the tip, and paste this on the foresight. On looking over the sights in the dark, when the luminous ball on the foresight is seen resting on the apex of the luminous triangle on the tangent sight, the gun will be truly laid for the range for which the sight is set.

Machine guns with the local reserves must be light and mobile; they will be used in a similar way to those with infantry, and to assist in counter-attacks, particularly against the advanced infantry positions and sap-

heads of the besiegers. They may also have opportunities of enfilading a trench or firing into a work that has been captured by the enemy. When used for this purpose they must be brought up by hand under cover and open fire at close range from a position that commands the interior of the trench or work, and if possible enfilades it. Great risks are justified in bringing up machine guns for this purpose, as the results of a successful fire action will usually be decisive and far-reaching.*

The following is an example of their use in this manner during the siege of Port Arthur :

"On the attack on 203-Metre Hill, machine guns on Akasakayama flanked the position and enfiladed the attackers. Four hundred Japanese were sheltered together in a parallel, where they were completely screened from fire from any part of 203-Metre Hill. Suddenly two machine guns, *which had been concealed on Akasakayama, where they could fire directly into the parallel*, opened fire. Within a few seconds it was turned into a veritable pandemonium, a seething mass of humanity, where men were wildly fighting to get away, trampling on the wounded, climbing over piles of corpses which blocked the entrance, and trying to escape down the coverless hillside. But the Maxims did their work as only Maxims can, and within a few moments practically the whole force was wiped out; a few men were shot dead as they ran down the hillside, but nearly all the others were killed in the narrow trench. It took the Japanese days

* This method is much used by both sides in the present war, in France.—AUTHOR.

to extricate and carry away the fearfully intermingled corpses." *

There are so many instances of the successful use of machine guns in the defence of Port Arthur that it will be impossible to quote more than a few of the most striking to illustrate the principle on which they should be employed.

At the third general attack on November 26th, at 2 p.m., a large force of Japanese assaulted Sung-shu fort, and having crossed the moat through a bomb-proof passage, they gained the parapet of the rampart and swarmed over it. "Into this seething mass of humanity the machine guns of the forts and batteries on An-tzu Shan poured such a tremendous fire that the attackers were mowed down, crushed, dispersed, and sent head over heels to the moat again in less than half a minute, before a single man had reached the interior of the fort. *The same fate befel a fresh attempt undertaken at five o'clock.*" †

Here we see the importance of machine guns being able to command the parapet of neighbouring works, and the necessity of reserving fire until the best possible target is presented, even though the enemy is permitted actually to scale the parapet. The same thing occurred at the storming of Erh-lung Fort. At midnight on November 26th the Japanese "made a desperate attempt to storm the upper battery, but the assailants were mown down by machine guns, *as soon as they appeared on the parapet.*" ‡

* *The Great Siege*, by W. Norregaard.

† *Ibid.*

‡ *Ibid.*

This is a good illustration of the use of machine guns at night, and no doubt these guns had been trained by day to sweep the parapet in anticipation of an attack after dark. "On January 28th, 1905, near Linchinpan; at about 7 p.m. the Japanese attacked the forts of Vosnesenski and the trenches near by in which were posted two machine guns. These latter opened fire at 200 or 300 yards on a Japanese company in line. *In one or two minutes they fired about 1,000 rounds and the Japanese company was annihilated.*" *

During the attack on North Chi-kuan Fort on December 19th, by the 38th Regiment under General Samayedda, which took place at 5 p.m., the men were sent over the parapet man by man from different points, to make it more difficult for the Russian machine gunners. "As soon as there was a little interval in the rattling of the machine guns, a man would jump up and run for his life, and seek shelter behind the débris piled up in the terre-plein after the explosion, or in the holes which the big howitzer shells had made in the ground. Though many of the men were shot down in the short race, little by little a force of about 150 men were assembled in the front part of the fort, and the commander, Captain Iwamoto, then led them against the sandbag trenches at the rear. . . . The fighting was mostly hand-to-hand, *but the Russian machine guns took an important part in the defence,* their galling fire making fearful ravages amongst the attacking party. The Japanese, therefore, got a couple

* Von Ullrich.

of mountain guns hauled up on the parapet, and with them succeeded in silencing the Maxims." *

Speaking of the use of machine guns in the defence of Port Arthur, Norregaard says: "As an active means of defence the search-light and *machine guns* undoubtedly come in the first rank. The Japanese acknowledge the immense value of machine guns to the defence. The searchlights are stationary, they say, and the ground round Port Arthur is broken, so that they can avoid them; but the machine guns can be moved about anywhere and can easily be shifted from place to place by a couple of men. It is nearly impossible to detect them and put them out of action; their effect on the Japanese was most disastrous and time after time enabled the Russians to beat off their attacks, inflicting severe losses. Nothing can stand against them, and it is no wonder that the Japanese fear them and even the bravest have a chilly feeling creeping down their backs when the enemy's machine guns beat their devil's tattoo. They shoot with amazing precision even at very long range, and they were splendidly served."

The U.S.A. Official Report on the siege of Port Arthur states: "Machine guns played an important part in the siege, being freely used by both sides. . . . The guns were used with telling effect against the Japanese in the numerous bloody assaults, *being trained to cover all the approaches with murderous fire.*" These last words condense into a single sentence their tactics in the defence of a fortress.

The Russians used the Maxim of .312 calibre manu-

* *The Great Siege*, by W. Norregaard.

factured by Vickers, Sons & Maxim, of London, while the Japanese used the Hotchkiss of .253 calibre made at the Arsenal at Tokyo. The Japanese had 72 of these weapons at Port Arthur, immediately under the command of the Divisional General, viz. 24 guns with each Division.

The use of machine guns in the siege of a fortress will cover a far wider field than in the defence, and much that has already been written of their employment both in the attack and defence of positions will apply to the attack on a fortress. It cannot be claimed for machine guns that they are as vital to the success of the besiegers as they are to the garrison, but that they often afford material assistance during assaults, in holding sap-heads and repelling sorties, cannot be denied.

The details of their tactical employment with the besiegers will differ greatly in accordance with the nature of the operations, and particularly with the situation of the fortress and the surrounding country. In the case of Port Arthur the broken and mountainous nature of the terrain, the deep ravines and rocky watercourses all lent themselves to the employment of machine guns, and consequently the Japanese were able to make greater use of them than would have been the case under less favourable conditions.

It will be impossible here to do more than briefly indicate how machine guns may be used to assist in siege operations generally, and then show how the Japanese used them before Port Arthur.

"When the enemy's advanced troops have been driven in and the preliminary reconnaissance has enabled the

line of investment to be fixed, this line will be divided into sections, to which commanders will be appointed and troops allotted. . . . Outposts will be established as closely as possible round the fortress in order to cut it off from outside communication and to protect the operations in rear." * Machine guns should be allotted to these sections in proportion to their importance in the line of investment. The commander of the section should use them according to the circumstances of the situation, but as a rule a large proportion of the guns should be distributed to the outposts. . . . The duties of outposts in siege operations are even more important and exacting than they are in the field operations ; in the case both of an investment and of a regular siege the brunt of the work throughout will fall upon the outposts. . . . They must therefore have greater power of resistance than outposts in field warfare in order to prevent the troops in rear from being disturbed by every skirmish. The outposts of a section which is maintaining a close investment should be about one-quarter of the total infantry allotted to the section, together with a proportion of artillery, *machine guns, and engineers.*" †

The positions for the machine guns should be along the *line of resistance*, which will usually be the piquet line. It will be necessary to provide bomb-proof emplacements for the machine guns, and alternative emplacements should be made for each gun. The temptation to engage in the fire fight must be resisted, and the

* *Field Service Regulations*, Part I., 1909. Reprint 1914, p. 166.

† *Ibid.*, p. 167.

machine guns should be solely employed for resisting attacks and their fire reserved till close range. Once they have been unmasked, it will be advisable to move them to a fresh position, leaving a dummy gun in the old position.

In the second phase of the siege the machine guns not required for the outpost line should be allotted to the local reserves and the general reserve, and will be used as circumstances require in assisting attacks on outlying works and in repelling counter-attacks. In the third phase machine guns must be pushed up to secure sap-heads and to assist the infantry in the assault; they will be found specially useful in covering the advance of assaulting infantry by sweeping parapets with fire and in securing captured works against counter-attacks. Sandbags should always be carried with machine guns supporting infantry in the assault, and the first consideration should be to secure the guns from fire on reaching a position. It must be remembered that machine guns in siege operations are always exposed to their worst enemy—artillery—and that their only hope of success is by concealment and cover. An example of their use in repulsing a counter-attack at Port Arthur is given by Nojine in his book *The Truth about Port Arthur*. Speaking of the attempt by the Russians to retake Chien-shan, he says: "The 13th Regiment took two-thirds of it, but could not advance further, as the Japanese threw in heavy reinforcements and brought up a number of machine guns. On the night of the 5th we had to withdraw and abandon further attempts to retake the position, as one attack alone had cost us 500 men."

The following account from the U.S.A. Official Report of the storming of Fort Erh-lung, one of the principal forts of Port Arthur, shows how machine guns can be used to assist in the final assault. "On December 28th the parapet of Fort Erh-lung was blown up at 10 a.m. by five mines being simultaneously sprung. . . . When the smoke cleared sufficiently, the exterior slope at the salient of the fort was seen to be filled with a dense crowd of Japanese infantry, who closely hugged the ground. . . . It appears that the Russians had occupied the heavy gun line which lies in the interior of the fort *and with machine guns* raked the front parapet and thus made it impossible for the Japanese infantry to leave their cover on the exterior slope. Meanwhile the Japanese brought up *three machine guns, and with these replied to the Russian fire from the heavy line.* . . . The bombardment kept up without diminution until about 1 p.m., when it slackened perceptibly on both sides. . . . About 4 p.m. the Japanese infantry could be seen working along the flanks of the work on the outside of the parapet. The Russians retired to the gorge parapet which had been arranged to fire to the front, and maintained themselves for several hours longer. By 7.30 p.m. the Japanese had fully mastered the position, and the largest and strongest of the permanent works on the front of attack fell into their possession. . . . A large number of field and machine guns * were included in the spoils of Fort Erh-lung. The assault entailed a loss of about 1,000 men to the Japanese."

* A great many machine guns were added to the forts from the fleet early in June.—AUTHOR.

During the attack on Wangtai Fort the Japanese used machine guns from the high ridge N.E. of the fort, and thus brought a heavy fire against the Russian interior line.

The Japanese invariably brought up their machine guns with the assault and lost no time in placing them in position to hold captured works. This is indeed their true rôle in the assault, as they will seldom be able to support the actual stormers with fire, but once a foothold is gained in a work, they may be invaluable for the purpose of holding it and thus set free the storming party for another advance.

CHAPTER VIII

EMPLOYMENT IN THE FIELD IN MINOR OPERATIONS

SMALL WARS

CALLWELL, in his well-known work on this subject, defines the small war in the following terms: "It comprises the expeditions against savages and semi-civilised races by disciplined soldiers, it comprises campaigns undertaken to suppress rebellions and guerilla warfare in all parts of the world where organised armies are struggling against opponents who will not meet them in the open field, and it thus obviously covers operations very varying in their scope and in their conditions." *

The British Empire, "upon which the sun never sets," is seldom without its small war in some remote part of the globe, and it is safe to affirm that there is never a small war in which the machine gun does not play a prominent part.

Wars against savages or semi-civilised peoples differ fundamentally in principles and tactics from war against a civilised enemy, and the tactics adopted will be governed by the object of the expedition and the tactics and arms of the enemy to be dealt with. Callwell says: "The tactics of such opponents differ so greatly in various cases

* *Small Wars, their Principles and Practice.*

that it is essential that these be taken fully into consideration. The armament of the enemy is also a point of extreme importance."

In dealing with machine-gun tactics in small wars, it is obviously impossible to treat with all the situations that may be met with or to attempt to lay down definite rules for their use under all the varying conditions of country, race, and arms before mentioned. It will therefore be sufficient for our purpose to show how machine guns may be used generally in warfare in uncivilised countries, and then to take a single typical campaign to illustrate their employment.

"Against an enemy who fights outside stockades, machine guns are very efficacious ; and in any case against all uncivilised people a sudden burst of fire from these is often most paralysing." *

After speaking of the jamming of non-automatic machine guns at Ulundi, Abu Klea, Dogali, and Tofreck, Callwell says : " On the other hand, Maxims, which can be easily handled and moved, have done excellent service in East Africa, in Matabililand, and in the campaigns on the North-West Frontier of India. There can be no doubt that machine guns of an easily portable and thoroughly trustworthy class may be most valuable in small wars, and they will probably be freely used in such operations in the future, especially when the enemy is inclined to attack in mass. In hill warfare these weapons scarcely get a proper chance, as they are not very well suited for picking off individuals and as it is dangerous

* *Field Service Regulations*, Part I., 1909. Reprint 1914.

to thrust them too far to the front with the small parties which are so much used in operations of this class. In bush warfare also the want of a fair target is unfavourable to them, and when the shooting is at short range the detachment is likely to be put *hors de combat*, as it offers such a good target; this happened at Owikokaro. An open field of fire and a well-defined object to aim at are almost more necessary to machine guns than to artillery. On the defensive, machine guns can hardly fail to be valuable. In laager, zarebas, and detached posts of all kinds they are always likely to be of service, and to a certain extent they may take the place of guns for such work. During the operations in Rhodesia in 1896 they were found very useful as a protection to the small laagers left behind by the columns when they moved out for a fight. Two of them did tremendous execution in Chak-dara Fort during the siege of that post in 1897. It is interesting to note that at the fight on the Shangani River in Matabililand after the attempt to capture the king had failed, the troops, although they were in a bad position, could not move to a better one for a while, simply because the machine guns would have been thrown out of action during the change of position. Against rushes of Zulus, Ghazis, or other fanatics the effect of such weapons is tremendous, as long as the fire is well maintained. In the excitement of the moment the best infantry may fire unsteadily; but machine guns can be absolutely trusted to commit destructive havoc in the hostile throng, provided that their mechanism does not go out of order." *

* *Small Wars, their Principles and Practice*, p. 441.

The above is interesting as showing the wide field for their use in small arms and yet how narrow the method of tactical employment. It may be summed up in a few words: a good target, a good field of fire, constant readiness for action, and sufficient protection to enable the gun to be handled with confidence.

Machine guns should form an integral part of the arm to which they are attached, and must be used with them to supplement their fire power. In attack they must seek positions from which to bring to bear a concentrated and overwhelming fire on the main body of the enemy, and against savages this must be from the flanks or rear to be successful, as the object is to prevent flight and insure decisive results. Their real value in small wars lies in their enormous defensive powers, which may be employed in clearing the way for columns in enclosed country, in stopping a charge of fanatics whether mounted or on foot, and in preventing small columns on the march from being overwhelmed by superior numbers.

It will be found that, although it is the invariable rule for the disciplined force in a small war to assume the initiative and attack with vigour on every possible occasion, the uncivilised enemy, by reason of his primitive arms and tactics, generally avoids the encounter until he is able to make an attack at a time and on ground of his own choosing. Thus we find the disciplined force thrown on the defensive in the early stages of the expedition and the very heavy losses inflicted then often directly lead to a speedy termination of the campaign. Callwell says: "The tactics adopted by the Zulus and Mahdists when

flushed with confidence were best met at a halt in close formation, even on ground where arms of precision could not tell with full effect. In the jungles of Dahomey the sudden hostile attacks on flanks and rear could be confronted most satisfactorily by the troops on the spot acting on the defence until the edge was taken off the hostile appetite for combat. . . . Where a small force of regular troops is opposed to great hostile masses, no matter how ill-armed or how deficient in morale the masses may be, circumstances render it almost imperative to act on the defensive."

For this reason alone machine guns form the most valuable arm in encounters of this nature, and their tremendous effect cannot be better illustrated than at Omdurman, where they literally mowed down the attacking masses in great swathes.

The first consideration when employing machine guns in a small war is the method of carrying the gun and its ammunition, which must be suited to the country in which the operations are to take place.

In the majority of cases it will be found that the usual transport of the country is the most suitable, and a tripod-mounted gun can be adapted to almost any form of carriage. In mountainous open country such as the North-West Frontier of India mules or ponies are suitable; in the desert the camel has been used; while in the forests of East Africa machine guns have been carried by porters on their heads, strapped on their backs, or slung beneath a pole by two men. Whatever method is adopted, it is essential that the gun can be brought into

action easily and quickly, and that it is at least as mobile as the troops it accompanies.

The operations in Somaliland in 1901-4 are an excellent example of one of our typical small wars, and will serve to illustrate the use of machine guns against a savage enemy in a bush country.

The camel is the transport animal of the country and riding camels were used to carry the machine guns with the infantry of the force. In the first expedition, under Lieut.-Colonel Swaync, there were three Maxim guns—two of which were .450 bore and one a .303. On June 2nd, 1901, Captain McNeil, who was left in zareba at Smala to guard the live stock, was attacked by about 3,000 Somalis, who increased to about 5,000 on the 3rd. His force consisted of three British officers and 500 native troops, many of whom were native levies and only 370 of whom were armed with rifles. There were about 3,500 camels, 100 horses, and some cattle and goats in a separate zareba from the men who were above and able to command it. The Maxim, under Lieutenant Young-husband and served by Somalis, was placed on a cairn of stones at the top of the men's zareba and commanded a good field of fire all round. The ground was fairly open all round, and clear of bushes for about 150 yards from the zareba. Before the camels could be driven in, the enemy's horsemen appeared and threatened to capture a large head of camels, to prevent which a section under a Jemada was sent out to try to keep off the enemy until these camels could be driven in. Captain McNeil says: "I supported him by turning the Maxim on the nearest

horseman. . . . Some of the horsemen had got round by now a good way out, but by keeping the Maxim on them, supported by long-range volleys from the Punjabis, we did much to check them." *

On June 3rd at about 9 a.m. a very large force of footmen attacked in one long line several ranks deep and enveloped the south and west sides of both zarebas. They came on at a steady pace and opened fire at about 400 yards. Fire was reserved until the enemy were at about 500 yards range, when heavy fire was opened by both rifles and Maxim, with the result that no one got within 150 yards of the zareba, though they advanced most pluckily. 180 dead were found around the zareba, and the enemy's loss was estimated at 500.

The danger of rushing machine guns up to the front while still mounted is shown in an incident that occurred on June 17th during a successful attack on the Mullah's villages near Feriddin. During the reconnaissance the mounted corps became somewhat heavily engaged, and Colonel Swayne sent forward the reserve company and the Maxims to bring fire to bear from a commanding spur about two miles to the front. On reaching the spur they came under a heavy fire, and the Maxim camels and some ponies were shot down. The Somalis, however, were able to disentangle the Maxims from the dead camels and bring them into action on commanding ground.† Colonel Swayne, in his official report, said: "Mekometers were badly wanted for the Maxims. . . . The Maxims had a

* Official Report.

† Official History of operations in Somaliland.

trick of jamming at critical moments, but were quickly set right again. The fault may have been due to the belts."

When the Maxim gun jams without a breakage of the mechanism, the fault is usually want of experience on the part of the gunner.

During the third expedition the machine guns were increased to eleven and were carried by porters with the infantry.

The disaster to Colonel Plunkett's force at Gumburu on April 17th was due to ammunition running short. The force, consisting of about 200 men with two machine guns, was attacked by a large force of horse and foot. They at once formed square, and took up a position in an open spot surrounded by dense bush at from 300 to 600 yards' distance. For some two hours they were able to hold off the enemy, but on the ammunition being exhausted they were overwhelmed.

On April 22nd, 1903, Major Gough's force of about 200 men with one machine gun was attacked in thick bush by a large force under very similar conditions to Colonel Plunkett. The attack began at 10.30 a.m. from all sides, and was continued with great determination until 2 p.m. Square was formed, and fire opened at very close range (20 to 50 yards), owing to the dense bush. "The Maxim, under Sergeant Gibb, was moved from place to place as occasion arose, the enemy always giving way when it opened fire." *

In the fourth expedition, under General Egerton, the

* Major Gough's Official Report.

ammunition per machine gun was 30,200 rounds in garrison, 10,400 rounds with the brigade, and 2,200 rounds in second-line transport; 6,000 rounds with each gun was carried ready in belts.

During the action at Jidbali on January 10th, 1904, the force engaged, which consisted of about 2,500, including native levies, the infantry, about 1,299 strong, formed the usual hollow square round the transport. The enemy consisted of the pick of the Mullah's fighting Dervishes, and were about 6,000 to 8,000 strong. The Dervishes advanced in regular skirmishing order, rushing from cover to cover, and lying down. A few got within 400 yards of the square, *but were unable to face the heavy rifle and Maxim fire that met them*, and this attack failed. Then two determined rushes were made on the front and right flank of the square, *but they were met with such a terrific fire from rifles and Maxims that the charging enemy could not face it*. At 10 a.m. the whole mass of the enemy broke and fled, followed by fire till it was masked by the pursuing mounted troops. Six hundred and sixty-eight dead were counted round the position two days later.*

"Much execution was done by the Maxim worked in the right corner of the square by Sergeant Gibbs, 1st Bn. King's African Rifles, on the groups of Dervishes taking cover behind the scattered clumps of bushes surrounding the square. One entire group of nine men was wiped out in a moment by this Maxim." †

It will be seen that machine guns are a very useful

* Official History of the operations in Somaliland.

† From Staff Diary of 1st Brigade.

auxiliary in bush warfare, especially in holding posts and defending squares from the rush of fanatics. They must always march with the main body of the arm to which they are attached, and be used as circumstances require. A high state of efficiency in working the gun, a thorough knowledge of its mechanism, and ability to bring it into action with great rapidity are of more importance in bush warfare than tactical handling, which is usually of the simplest description.

MOUNTAIN WARFARE

"The principle of always having bodies of men in rear or on the flanks, covering by their fire the advance or retirement of the troops nearest the enemy, is specially important in hill fighting. On nearly every ridge and spur positions will be found where this can be done, and advantage can also often be taken of parallel features, from which covering and cross fire may be used with effect." *

It will seldom be possible to make much use of machine guns with the advanced guards, as mountaineers usually oppose the advance by bands of skirmishers who fire from the cover of rocks and scattered sangars, and while affording a bad target to the machine gun, can quickly put it out of action by concentrating their fire upon it. They are also unsuitable for piqueting the heights, on account of the difficulty of getting them into position and of rapidly withdrawing them again. They are,

* *Field Service Regulations*, Part I., 1909. Reprint 1914, p. 199.

however, very useful to strengthen small fortified posts on the lines of communications, and for the defence of camps by night, being trained by day and the sights prepared as suggested in Chapter VII., page 155. Callwell says : " It is a good plan, if night attacks are at all probable, to train guns and machine guns by daylight upon points where the enemy may be expected to mass, or from which assault is to be anticipated. *This was done at the defence of Chakdara in 1897 with excellent results.*"

Machine guns are invaluable to the rear guard of a force retiring, which is an exceedingly difficult undertaking in mountain warfare, because hillmen invariably await this opportunity to swoop down and make a vigorous attack. The very nature of the operations necessitates frequent retirements. Callwell says : " Columns have to visit outlying valleys for punitive purposes, and must then rejoin the main body ; and even when penetrating into the heart of a hostile mountain district, the rear of the army, as it passes successively the homes of different tribes and clans, draws these down upon it, and, as a result of the general direction of its march, retires before them."

Field Service Regulations, 1909, Reprint 1914, speaking of rear guards in mountain warfare, says : " Mountain artillery should usually form part of a rear guard, and machine guns may be usefully employed. The withdrawal of the artillery is usually an encouragement to the enemy to press on, and on such occasions machine guns will often find scope for action. . . ." " If the rear guard

commander considers it impossible to reach camp before nightfall, it will generally be advisable for him to halt and bivouac for the night in the most favourable position for defence." Here, again, machine guns will be most useful in defending the bivouac after dark if trained by daylight to sweep approaches, while the moral effect of its accurate fire in the dark will be considerable. There are many instances from our wars on the North-West Frontier where machine guns might have been used profitably in covering the retreat; but to be successfully employed in such cases, they must be far more mobile and better trained for rapid-fire practice than they have been in the past. Lieut.-Colonel Haughton's retreat from the Iseri Kandeo Pass is typical of such operations. "A brigade had been sent on detached duty into the Warais Valley, and after completing its work there was rejoining the rest of the army in maidan. In doing so the brigade had to cross the Iseri Kandeo Pass over the hills which separate the two valleys. As the force quitted its bivouacs the Gurkas were left as rear guard, while the 15th Sikhs were told off to hold the Kotal, which was about half-way. The main body and baggage moved off early, and the latter reached the maidan almost unnoticed. The Gurkas, however, were pressed from the commencement of the retirement right up to the top of the Kotal; then they marched on, leaving the 15th Sikhs to cover the retirement. As the Sikhs began to draw in their piquets from the heights above the pass, the Afridis, as was their wont, grew bolder and bolder, and, taking advantage of the cover of a wood hard by, they crept

down close to the rear guard. One company as it withdrew was suddenly charged by a crowd of swordsmen. . . . But those who participated in this rush paid dearly for their temerity, the Sikh company meeting them with steady musketry and being most opportunely reinforced by another company. The carrying off of the wounded was, however, becoming a matter of serious difficulty, so reinforcements were asked for. These arrived in the shape of two companies of Dorsets and of several companies of the 36th Sikhs under Lieut.-Colonel Haughton, who assumed command, and who withdrew his force down the hill without much loss." * It is easy to imagine how machine guns might have been used here, and how their presence might even have rendered the reinforcements unnecessary; but unless they are capable of coming into action and opening fire in thirty seconds, and of packing up and moving off again after ceasing fire in the same time, the rear guard in mountain warfare is no place for them and they had best march with the baggage.

During the expedition to Tibet some trouble arose with the machine guns owing to the extreme cold, which not only froze the water in the barrel-casing of the Maxims, but froze the lubricating oil in the lock and recoiling parts and thus rendered the gun useless. "When very low temperatures are encountered in high latitudes, alcohol or spirit should be added to the water to prevent it freezing; and as potable spirit is liable to "evaporate," a little paraffin oil should be added. Glycerine may be

* Callwell's *Small Wars, their Principles and Practice*.

substituted for lubricating oil in temperatures where even Russian petroleum will freeze.

CONVOYS

Callwell defines a convoy as "a column of non-combatants guarded by a comparatively speaking small escort." The object of this escort is to hold off all hostile parties and to get the convoy to its destination in safety. Escorts will generally have to be reduced to the smallest possible size in order not to deprive the fighting force of men. They will therefore always act on the defensive, while endeavouring to keep moving with the convoy, which will only be halted when compelled to do so for its own safety. When the escort consists of the three arms, machine guns may be used to reduce the number of infantry required very considerably, while adding to the defensive power of those necessary.

In minor operations where every available rifle is required with the fighting force, machine guns will be found invaluable to replace infantry. Their exact position with the convoy must depend upon its composition and length and the number of guns available. The principle of having a machine gun, or where possible a section, at the head and another at the rear end of the line of wagons or pack animals is sound, as these are the vital points, and an attack on the centre can be met by a cross fire from these positions. If the convoy is unduly long, another gun or section may be placed in the centre. Should it be necessary to form laager, the machine guns

in the front and rear enable this to be done under their converging fire. Where wagons or carts are used and the enemy is unprovided with arms of precision, machine guns may be mounted on the tops of wagons, so that they can open fire instantly and fire while moving forward with the convoy; this position not only provides them with a good field of fire, but also affords protection to the detachments from a sudden charge home of savages from an ambush.

“The success of an attack upon a convoy usually depends upon the defeat of the protecting troops. This will involve a combat, which will be governed by the principles already laid down in this manual. . . . If fighting is inevitable, the enemy should be engaged as far from the convoy as possible.” *

For this reason machine guns should open fire on any body of the enemy presenting a good target, even at long range, if they are moving to attack the convoy. The presence of machine guns with a convoy will free the infantry to move out wide on the flanks in open country, and to push ahead to piquet hills, clear bush, and occupy heights on the line of march, without exposing the convoy to danger during their absence.

BLOCKHOUSES

Blockhouses have been much used in warfare in uncivilised countries ever since the introduction of firearms, to enable small detachments on a frontier or on the lines

* *Field Service Regulations*, Part I., 1909. Reprint 1914, Sect. 157.

of communication to maintain themselves in the midst of the enemy when unsupported by other troops, and also to form a chain of posts across an enemy's country for the capture or suppression of guerilla bands.

Looking back to the South African War, it appears inexplicable that little or no use was made of machine guns to hold the long blockhouse lines which stretched for so many hundreds of miles in every direction during the latter stages of the war. Time after time the Boers succeeded in breaking through this line, even in places where the blockhouses were within effective range of each other and the intervening space was guarded by elaborate barbed-wire entanglements. The reason for this is not difficult to discover. Screened by the darkness, the fire of the small garrisons of these blockhouses was neither sufficiently powerful nor accurate to stop the majority of the enemy from breaking through, even though stopped by the entanglements and compelled to use a single gap. The annihilating and concentrated fire of machine guns which have been laid by day to sweep the entanglements should render the forcing of a similar blockhouse line impossible in the future. Machine guns in detached blockhouses should be sited as low as is compatible with a good field of fire, and should have long narrow loopholes prepared for them for at least two positions on every face. Constant change of position within the blockhouse after firing will prevent the enemy from being able to "snipe" the gunners through the loopholes.

The great variety of conditions and circumstances under which minor operations take place renders it

impossible to do more than show how they may be used in certain selected instances. The machine gunner must be prepared to modify and adapt his tactics to suit the special circumstances of the expedition with which he is employed, and he cannot do better than study Callwell's *Small Wars, their Principles and Practice*, which has been so freely quoted in this chapter.

ENCLOSED COUNTRY

This chapter would not be complete without some reference to the use of machine guns in enclosed country such as is found in the United Kingdom. Clery, in his *Minor Tactics*, p. 118, says that cultivated country is the most favourable to the attack, while in defence the country to the front cannot be too open. "In the first, infantry gains a succession of covered positions by means of which it comes on more equal terms with the defence. In the second, the infantry of the defence has a clear field to destroy the assailants as they approach."

Apart from civil war, the only possible occasion for the use of machine guns in the British Isles is against an invader, and it is well known to students of modern war that the prospects of a successful invasion do not depend upon the strength or weakness of our fleet, but on that of our army for home defence. The duty of a fleet in time of war is to go to sea and destroy the enemy's ships, and while it is absent on this mission an opportunity for invasion may occur, the success of which will wholly depend upon the force the invader will meet on landing.

The Japanese recently landed in Manchuria in spite

of Russia's superior naval strength; but, because it was the case of an island invading a continent, we do not apply the lesson to ourselves, and are content to believe that a continent cannot invade an island.

It is obvious to the military student that no invasion will be attempted unless its success is reasonably certain, and the presence of four divisions of regular troops at home renders such an enterprise extremely difficult, if not impossible, without permanent command of the sea. But these four divisions are not the Home Defence Force, and form that part of our Expeditionary Army for service outside the United Kingdom. We may, therefore, rest assured that as long as we retain command of the sea, no invasion can take place until we are involved in an over-seas war which requires a more or less large portion of our Expeditionary Force—an event which has happened in almost every decade.

It will be safe, therefore, to assume that in the event of an invasion we shall have to rely on our Territorial Army to meet the enemy, and it will be doing this force no injustice to assume that they will be compelled to act on the defensive in the face of a highly trained and disciplined Continental Army. Indeed, it is difficult for a soldier to realise how a Volunteer force, trained for fourteen days in the year and unacquainted with military discipline, can hope to meet on equal terms, even if superior by three to one in numbers, the pick of Continental manhood trained under an iron discipline for the minimum of two years.

Be that as it may, it is necessary to realise the difficulties

to be faced, not the least of which is the question of *training*, for, as already pointed out, it is absolutely essential to the successful use of machine guns that the personnel should be very highly trained, and this applies to their use in enclosed country even more than elsewhere.

Although as a general principle enclosed country benefits the attacker and is disadvantageous to the defender, this is not always the case with machine guns, and provided the golden rule of "concealment, cover, and surprise" is intelligently applied, enclosed country is particularly suited for the use of machine guns in the defence.

For this purpose machine guns should be trained to work in pairs in mutual support. They must be so mounted that they can be carried by hand for considerable distances into position, and must be capable of firing from a low sitting when they must be inconspicuous. If mounted, as at present, on a wheeled carriage, a light tripod may be carried on the carriage, which will render the gun far more inconspicuous and useful.*

While all the principles for the tactical handling of machine guns with infantry hold good, there are several points of importance to be noted in using them in the defence in enclosed country. The advance of any formed bodies of the enemy will be confined to the roads; consequently machine guns must endeavour to command all roads leading from the enemy, especially where they become defiles.

The hedgerows, standing crops, woods, and lanes

* This has now been done.—AUTHOR.

must be used to afford concealment in advancing or retiring from position to position, and scouts must be specially trained in finding the easiest *concealed* way from field to field by gates, gaps, or through stiles. The way from the road or lane to the selected position must be always marked by sticks or broken branches which are placed to indicate the direction of gates or gaps, or where a turning has to be made. The usual procedure will be for the scouts to work across country on one or both sides of the road. The section commander, who should be mounted, will select the position for the guns, and scouts from each gun will be sent out to guide them to the positions. The carriages and ammunition cart must move up the road to the nearest point to the position, and scouts should select and mark the easiest way to the carriages. Careful co-operation between the guns and carriages will often enable the latter to greatly facilitate movement, by pushing up by-lanes or across fields to a position near the guns. Ammunition will usually have to be carried to the guns by hand, so that great pains must be taken to get the cart as near the position as possible. The selection of the position will be governed by the facilities it presents for surprising the enemy in close formation at effective range. The range must be accurately found, and fire must only be opened by order of the section commander. In selecting a position care must be taken that it offers perfect concealment from view, and that the guns can retire under cover to their carriages. The neighbourhood of conspicuous objects, such as single trees, a gap in a fence, etc., must be carefully

avoided, and care must be taken to secure a good field of fire for as great a distance as possible to the front, while the flanks and any cover within effective range which the enemy might occupy must be watched by scouts. It is in this matter of careful reconnaissance, of selecting ground and occupying or watching all neighbouring cover, that the successful use of machine guns in enclosed country mainly depends. The enemy is obliged by the nature of the country to move in close formation to pass defiles, roads, gaps, or to avoid crops, woods, and villages, and it is the intelligent anticipation of where this will occur that gives the machine gun its chance for decisive action. The hedges, orchards, lanes and woods, and other features will afford endless opportunities for bringing *flanking* fire to bear on the enemy. Nothing is so effective, and the moral effect on an enemy who is enfiladed at close range renders it usually decisive.

Cover will generally be provided by the spade, and ditches require little work to turn them into excellent pits, the only thing necessary as a rule being to excavate a hole in rear for the back leg of the tripod. Where there is a ditch with a hedge in front of it, the ditch should be improved so as to provide a pit for the gun to fire through the hedge about six inches above ground level. If the hedge is too thick to fire through, it should not be cut down, but a hole should be cut in the growth for the muzzle of the gun sufficiently large to aim through. If it is necessary to cut a gap in the hedge, the growth should be cut through close to the ground, but *without removing it* until the moment for opening fire.

Alternative positions in the same hedgerow should be avoided, as it is certain to be discovered immediately, and the range is probably already known.

The edge of the wood, if it commands suitable ground, is an excellent position for machine guns; but if the carriages remain in the wood they must be provided with cover. When time and material are available, a good field of fire may be obtained by erecting a platform ten to twelve feet above the ground in the trees, and placing a machine gun on this; not only is the field of fire much increased, but the gun will be almost impossible to discover. This was done on one occasion in the Spanish-American War, when it met with considerable success.

When machine guns are used for the defence of villages or farms, they should be placed outside the village or farm buildings well clear of the walls. The salient angle will usually be the most suitable place, a good field of fire being the chief object. The guns should be placed so as to flank one side of the village, and must be most carefully concealed, a pit being usually the best form of cover. Walls should as a rule be avoided, as they are very easily destroyed by artillery fire and always afford a conspicuous target.

When time permits the pits should be deepened and hollowed out in front to afford the firers protection from artillery fire. Similar protection may be provided for the rest of the detachment by making a narrow and deep trench connected with each side of the gun pit. Should it be necessary to defend the village to the last, a second position should be provided in the centre of the village,

commanding the main avenues, and the church tower, or roof, may afford a suitable site, provided artillery is not present.*

Although machine guns have never been used in England, they were employed by the French in 1871 during General Chanzy's retreat from the Loire to Le Mans with great success, and this campaign is particularly interesting to us because the country greatly resembles England. Dr. Miller Maguire, in his lecture given at the Royal Artillery Institute on this campaign, quotes the German official account as follows: "The entire country is covered with the densest cultivation of long-standing growth, with vineyards, orchards, and vegetable gardens. . . . Owing to the extensive subdivision of land customary in this country, every property is surrounded by hedges, ditches, and walls. There are, consequently, numerous positions and isolated points at which even moderate troops could defend themselves behind good cover. Although the superior effect of the chassepot here ceased to avail, *the mitrailleuses were in their true element*, and became a dangerous weapon in the narrow passes." Dr. Maguire remarks: "I do not know how far you will be inclined to apply those remarks to the circumstances of your own country in the event of invasion. It might be a good lesson to try; for the several arms could be handled between Dover and London step by step." Later on he quotes from a British officer, who says: "In

* This was written six years ago. It is interesting to note that the Germans constantly concealed their guns in roofs—firing through a lifted slate.—AUTHOR.

fact, Kent and Surrey combined, with vineyards instead of hop gardens, would be an exact picture of the country through which the Germans were pushing on."

There are numerous instances in this campaign where the mitrailleuse caused great loss to the Germans, and enabled the French to delay their advance and hold on to villages and positions with greatly inferior forces.

Remembering that the mitrailleuse of 1870 was a clumsy and primitive weapon, worked by hand and mounted on a field carriage, there is every reason to suppose that the modern automatic machine gun, on its light and mobile tripod, will be still more valuable in fighting in enclosed country.

APPENDIX I

NOTES ON CARE AND ADJUSTMENT OF GUN

THE BARREL.—The chief trouble to the barrel on service will be caused in the nickel fouling which quickly forms after a few thousand rounds of rapid fire. It will be found that no amount of ordinary cleaning will have any effect on this. Nickel fouling can only be removed when it is semi-molten, and if oil or boiling water is used, it will only harden the nickel and render it impossible to remove.

Nickel fouling can, however, be instantly removed by pulling through with a stiff gauze while the barrel is still hot, immediately after rapid fire, when the nickeling is in a semi-molten state, and will adhere to a dry, tight-fitting gauze.

Erosion of the barrel reduces the recoil, and the weight of the fuze spring will have to be reduced. When the weight of the fuze spring is reduced to about 3 lb., the muzzle attachment must be brought into use. When the weight of the fuze spring has to be reduced to about 3 lb. with the muzzle attachment on, the barrel must be replaced by a new one.

The barrel should be replaced when the coppering becomes striped close to the packing-gland, as then the recoil will probably tear the gland and the asbestos packing.

Nearly half the life of the barrel will be used with the muzzle attachment, and it will be found necessary to carefully scrape the fouling from inside, otherwise the bullets will touch it on their passage through, and thus cause considerable inaccuracy.

The muzzle attachment and the packing gland should on no account be screwed up hard against the face of the barrel casing with a tool, but they should be screwed on all the way by hand.

To remove the muzzle attachment use the No. 2 punch inserted in one of the gas escape holes, being careful not to touch the barrel. This will be found much handier than the gib key.

The thread on the attachment will often require running round with a three square, dead smooth file, as the thread constantly gets burred, and will be difficult to fit unless this is done. A little care in keeping this thread "fine" will save an awkward delay when in action and the muzzle attachment has to be used in a hurry.

The Feed Block.—This never gives much trouble. The teeth of the top pawls sometimes slip over the belt, when they will require resharpener with a file.

The right cartridge ^{of extractor} guide sometimes becomes hollowed out on the top by being struck repeatedly by the rim of the cartridge in the feed block.

The back-lash in the feed block with a full belt will cause a series of "No. 3" stoppages for which there is no apparent cause. When this occurs it shows that the top lever is slightly out of adjustment. To remedy, remove the top and bottom levers of the feed block, put the levers together, hold the bottom lever in a vice and pull the top lever inwards with a pair of tongs.

The Tangent Sight.—The rough use inseparable from active service will very often cause the slide to have a lot of vertical play. It will be found on examination that the pawl fixing pin has worked loose in the pinion. To remedy this on service, knock up the hole in the pinion with a hammer until the fixing pin fits tight again.

The Lock.—The extractor must fall by its own weight. When it fails to do so, fit the gib spring cover tight, and see it is clear of the face of the lock casing. The side levers and

screwed head must fall by their own weight when the lock is at full cock; if they do not, the side levers are probably slightly bulged outward at the tumbler axis pin clearance.

This is a common occurrence after firing. To remedy, tap both side levers over the clearance with a hammer until they fall easily; this will put them right, unless they are sprung from the trunnions, in which case the lock must be changed.

When the sides of extractor levers become worn, set back the side levers, or hammer extractor levers at lower edge to set the head up and lift extractor.

Broken firing-pins are nearly always caused by their striking the back of the gib spring cover or the top of the firing-pin hole in the extractor. When this occurs, look at the tumbler axis-pin hole and the tumbler axis pin to see if either or both are worn. To remedy this—place a piece of steel into the lock casing to form an anvil and prevent damage to lock casing, and then tap up the edge of the hole with a hammer until the axis pin fits. When stripping the lock always place the *least worn* axis pin in the tumbler and the other into the trigger. Other causes of broken firing pins are—dent of firing-pin too far back, or strained tail of tumbler, either of which denotes that the lock never cocks on the sear when in the gun.

To test this, put the lock in the gun and press double button, open the cover, and slowly turn the crank handle on to the buffer spring; the lock should cock on the sear before the crank handle becomes vertical. Occasionally a new lock will be found to be a shade too long, even without a washer on the connecting rod—this prevents the screwed head and connecting rod from rising sufficiently to ensure the breach remaining closed at the moment of firing—if nothing worse.

For the same reason great care should be taken not to fit too thick a washer on the connecting rod. To test the proper bearing of the crank and connecting rod, a piece of tissue paper should be placed beneath the crank stop, when the crank should ~~just touch~~ it, ~~but not~~ tear it when pulled away:

hold

and

When fitting a washer to the connecting rod, the spring cotter should be well opened out.

Side Plate Spring.—It will be found advisable to file that part of the spring which engages the extractor at an angle, so that the sharp edge may engage in the recess.

The Mounting.—The chief fault likely to develop on service is vertical play in elevating gear due to rough usage. To remedy this a thin brass washer should be fitted so as to lie on the top of the steel nut. This will take up the play of the outer screw. If the inner screw becomes loose, mix vaseline with whiting into a very stiff paste and smear on the inner screw. This will not only prevent all play, but is a preservative against rust.

Joint pins are very liable to be lost, and should be secured by twisting a double strand of telephone wire into a cord, which is easy to obtain, and is very serviceable for securing them to the Mounting.

The Steam Tube.—Remove and clean the steam tube after prolonged firing.

The constant oiling of the gun and the replenishing of water in the barrel casing on every possible occasion, will go far in preventing the occurrence of mechanical failures and will greatly prolong the life of the gun in the field.

The escaping steam from the steam tube, when the gun is firing rapidly for any length of time, is a source of danger, as it is easily seen by the enemy, and the gun will be located, and draw fire. To avoid this, obtain about 6 ft. of $\frac{1}{2}$ in. canvas piping, rubber-covered if possible, and attach it to the end of the cork plug, after removing the centre pin. The pipe must be firmly bound round the cork plug, and a piece of small hoop-iron attached so as to go round the barrel casing to hold the cork in, otherwise it will fall or be blown out.

If the end of this pipe is now placed in water, or beneath wet grass or leaves, the steam condenses at once, and is no longer visible.

APPENDIX II

METHOD OF USING THE "SPIKE" MOUNTING

OBJECT.—To enable a Maxim gun to be fired at short range (i.e. up to 400 yards) when it is impossible, for tactical reasons, to bring up or mount the gun on the tripod.

METHOD OF USE.—The "Spike" will be carried on the tripod attached to the leg in a leather case.

In the final stages of the attack, when it is impossible to bring up gun and tripod, as in present trench warfare, the gun is mounted on the "spike" and dragged into required position; the spike is then forced into the ground, on a bank, edge of trench, or on a sandbag, and the gun fired in the lying position. It will be found quite accurate at under 400 and very easy to traverse.

The gun can be advanced by rushes by one man without removing the spike.

In Defence.—When impossible to mount gun on tripod owing to heavy fire the gun can be dragged into any position to which a man can crawl, and can be fired from a parapet, or sandbag, or through a loophole. If necessary to move, the gun is always instantly ready for action.

NOTE.—The spike should not be driven "home" except on a soft parapet or bank. The spike must be quite upright or the gun will be tilted; it should be driven a half to three-quarters in the ground, and is driven in by lying on the gun and twisting it slightly left and right.

The gun is never dismounted from the spike until it is again desired to use the tripod.

The belt should be placed on the ground when the gun is firing.

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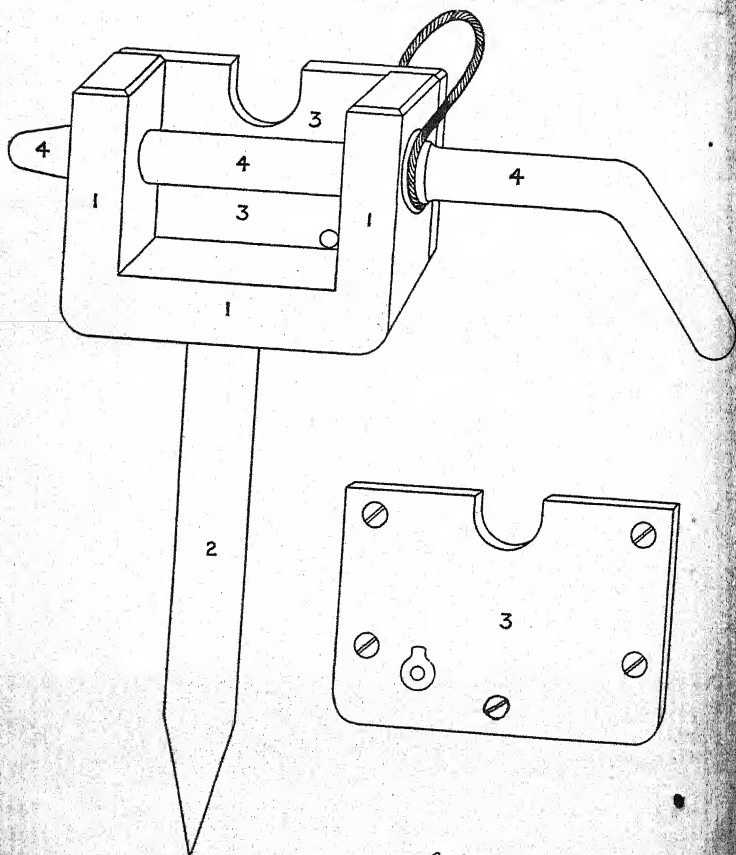
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THE MACHINE GUN SPIKE MOUNTING ^{half} (ACTUAL SIZE)

DESCRIPTION

1. Crosshead: $\frac{1}{2}$ " mild steel $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " \times $1\frac{1}{2}$ ".
2. Spike: $\frac{1}{2}$ " mild steel \times $5\frac{1}{2}$ " squared and riveted to crosshead.
3. Front Plate: $\frac{1}{2}$ " mild steel screwed to front of crosshead with 5 screws.
4. Crosshead Joint Pin: Government pattern with securing wire, loop riveted to front plate.

This can be made in a few days by any Engineer or Armourer who has a lathe.

